THE IRON AGE

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New York, April 11, 1918

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NATION WIDE STEEL-SERVICE

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CHICAGO PLANT

IRON AND STEEL REQUIREMENTS FROM FOUR LARGE STEEL-SERVICE PLANTS

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IRON STEEL MACHINERY

THE IRON AGE

New York, April 11, 1918

ESTABLISHED 1855 VOL. 101: No. 15

Economic Factors in the Iron Industry

What Direction the Developments in the United States First Took—First Part of a Brief History from the Broad Standpoint

BY DR. MALCOLM KEIR*

THE story of iron and steel in the United States turns about one central theme, namely, the market for the products. As the market has changed, so has the location of the industry shifted, its technique advanced, and its output given new forms. Raw materials, especially fuel, have had an important bearing upon the manufacture of iron, particularly upon the localization of the primary branch that transmutes ore into pig iron; nevertheless, the power of the market has dominated raw materials and even forced the adoption of new fuels. Consequently the market has been at all times the most influential factor directing the destinies of the iron and steel business.

Each period in the economic history of our country has been set apart by some prevailing interest, and naturally enough, an industry so closely allied to every-day activities as iron and steel reflects the popular concern in its own annals. An account of iron and steel is a miniature of the industrial chronicles of the United States. Thus it comes about that during the colonizing era the market for iron was strictly limited to the locality where the iron was produced, but that later on, when commerce absorbed the attention of the settlements, iron makers found an outlet among shipbuilders and distillers. After prospering for a hundred years in this market the masters of forges discovered new claimants for their goods among the first pioneers who pushed westward to form settlements in the valleys that front the Alleghenies. When two wars with Great Britain left America free to develop her own resources, the industrial expansion of the East and the agricultural advancement of the lands west of the Alleghenies, both provided an admirable stimulus to melters and fabricators of iron. But it was not until the railroads came into prominence in the years succeeding 1830 that the really great markets for iron ore were discovered. No equally important outlet for iron wares has been brought to light until recently when shipbuilding and foreign trade once again claimed the interest both of the nation and of ironworkers. Local uses, maritime needs, frontier necessities, factory and farm equipment, railroad construction and outfitting, shipbuilding and foreign trade; these have been the markets that have determined the economic history of iron and steel.

A Maritime Steel Industry Is Foreshadowed

by the author, whose thesis is that markets have always been the dominant force directing the iron and steel business of the country. First established on the Atlantic coast, producing plants found location successively inland as the market thus retreated, until now with new markets on the border of the ocean, through the expansion of foreign trade, the industry will be brought back to the regions where it started. Thus also is it the contention of the author that the presence of raw materials is proved a secondary matter.

No colonial farm or village had a great need for iron products, and even what little they did use could be dispensed with[1] in times of stress or places of scarcity; yet a small quantity was everywhere desirable for nails, pots, kettles or tools. Accordingly, after permanent settlements had been made upon the Atlantic coast, there was not a colony except Georgia[2] that did not establish forges for itself.

The reasons why iron making was practised almost everywhere are not difficult to perceive. In the first place, iron was relatively expensive to import; its bulk and weight were great in proportion to value, and the danger of injury was ever present, particularly in the case of cast articles, such as pots or kettles. It was estimated that on account of the cost of transportation the distance from Great Britain to the colonies gave the American iron makers the equivalent of a 25 per cent protective duty. In the colonies themselves the same factor, difficult transportation, kept the industry local; overland carriage was impossible and coastwise traffic impracticable because of the weight or brittleness of iron. Furthermore, no center could get news of small orders from remote villages until long after the need had passed. Finally, there was no common medium of exchange because metal money was so scarce that each locality transacted its business by barter or by a local currency. This fact impeded free and easy

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[1]Log cabins were often made without nails by crossing the logs one over the other and allowing the ends to project. More elaborate cabins were held together by fitting the logs into each other by means of notches. Sometimes, too, beams were held in place by rawhide thongs. The Mission at Monterey, California, is made in this manner and may be seen even to this day.

[2]Georgia was the last colony settled and was never prosperous before the Revolutionary War. Even after the war, troubles with Cherokee Indians hampered its progress, so its iron history is almost entirely confined to the years since 1830.

exchange of products between colonies distant from each other.

As a result of these conditions no one place was so advantageously situated that it could manufacture the iron for all other communities; on the contrary, all the factors tended to encourage supplying each local market from a local source.[3] There was not a colony in which iron did not exist in some usable form, while as for fuel, there was a superabundance since charcoal was employed for that purpose. Lime, the third requisite for iron production, was widely distributed and existed in many forms, varying from the common limestone to oyster shells. Consequently the three important raw materials—ore, fuel and flux—were easy to obtain; with them present it was an easy matter to reduce ore to metal because the business could be done on a small scale with simple apparatus. Indeed most early iron enterprises were nothing more elaborate than blacksmith shops with forges, hand bellows, anvils and hammers. So each community possessed an iron forge as part of its necessary equipment just as saw mills, grist mills and fullers' shops were found everywhere.

The Making of Nails by Hand

In addition to supplying farmers and townsmen with pots, kettles and tools, a large amount of bar iron was produced to be slit into nails, for which there was always a demand. Before the Revolution all nails were made by hand and for that reason there was a constant shortage of them. Since it required no training to hammer out nails from bar iron it was customary for farmers to spend their idle time in winter at this occupation, and in many homes it was an evening job throughout the whole year. Tacks were made in the same way. Frequently nails or tacks took the place of money or agricultural produce when the farmer went to the nearest village store to barter. In 1790 Jacob Perkins of Massachusetts invented a slitting and heading machine that reduced the cost of nail making to one-third that of the household product, so the little forges by the hearthstones ceased to work.[4] Nevertheless, nail rods were sold at stores in the remote back country of the south until quite recent years and tacks continued as a household industry until 1830.

Despite the enormous modern development of the iron and steel industry, local forges have continued in existence down to our own times. These are usually in the by-ways of the country, far removed from active contact with the world outside and hence remain in response to inaccessibility the same factors that gave rise to the original small local forges. A few are nearer civilization and are known as "high water forges," that is, they operate only when iron is so high priced that their relatively high cost of production may be met.[5] In the main, however, the strictly local iron business was confined to colonial times. Even then, despite the wide diffusion of iron making, one colony soon surpassed all the others by a generous margin and led the country in production for over a hundred years. Massachusetts was that colony, although iron was first discovered in North Carolina[6] and first manufactured in Virginia.[7] That Massachusetts should hold this position points to the importance of a market, for Massachusetts alone of all the colonies presented a considerable outlet for iron goods.

Massachusetts Long a Leader in Iron Making

The Bay Colony differed markedly from the others along the Atlantic coast in that it had no agricultural products to offer abroad in exchange for goods. New York sold grain, cattle and dairy products; New Jersey was the ranching colony, cattle and hogs roamed its wastes; Pennsylvania was the heart of the colonial grain belt; Delaware held title to the flour milling center with Wilmington corresponding to present-day Minneapolis; Virginia, the largest colony, gained wealth and fame by means of tobacco, while the Carolinas and Georgia produced an excess of rice and indigo; everywhere there was an agricultural surplus save in New England.[8] Without hope of winning distinction in cultivating rocky, steeply pitched fields, the people of the northeast early turned their backs upon the land and looked to the sea for sustenance; from it by fishing, shipbuilding and commerce they gained distinction and fortune.

Massachusetts received its impulses toward trade not only from a lack of agricultural wealth, but also from the presence off her shores of waters teeming with fish. Fishing, as a consequence, was the first activity to attain prominence. Since it is almost an axiom that no industry can become great without giving rise to contributory enterprises, it was but natural that the extensive fishing business was accompanied by shipbuilding and commerce. These two in their turn provided a large market for iron.

Iron entered into marine outfitting in many ways, the most obvious, of course, being the nails that held ships together. As we have shown, this was largely a household industry, but many furnaces were necessary to furnish the bar iron. As a consequence, the first successful furnace established at Lynn in 1645 was followed by another at Braintree in 1646 and in a short time Boston was ringed round with iron-making establishments. It was in Massachusetts where the largest market existed that nail-making machines first became common. They were in general use by 1795 and during the five years preceding and succeeding that date no less than twenty-three patents were issued for nail slitters.

An iron casting that every vessel possessed was the ship bell. A bell is as much a component of a boat as its rudder or its anchor. The latter was still another of the iron castings required to complete a ship's gear. Each vessel required at least two, and since fishing was done from small boats each dory had to have its own small anchor. The manufacture of bells or anchors, consequently, was a business of no small value.

One item of equipment for colonial ships is likely to be overlooked. No sea was safe from marauders; pirates lurked off the mouth of every river and each merchantman was the prize sought by numerous freebooters. As a result even the smallest trading vessels carried an extremely heavy armament for protection, or if opportunity arose for aggression. Not only were the cannon

[3]The assemblies of Virginia (1662) and Massachusetts (1637) helped to keep their iron industry local by forbidding the export of iron.

[4]Between 1790 and 1800 there were 23 patents granted for nail making machines, and by 1825 the total was 120. This is a measure of the importance of nails to young growing settlements. In 1810 nail rods comprised 25 per cent of the total output of iron.

[5]Louisville, Ky., in its petition for the government armor plate plant, urged the advantage of its city in possessing nearby a string of these "high water" furnaces that would offset any possible shortage in pig iron.

[6]By Sir Walter Raleigh's ill-fated settlement at Roanoke Island, 1585.

[7]By the Jamestown colony in 1607.

[8]Inasmuch as a colony was valuable to the mother country in proportion to its supply of raw materials, the West Indies were held in far greater esteem than the niggardly lands that fronted Massachusetts Bay and Long Island Sound.

set up on merchant ships the product of American works, but the balls, too, were supplied by our furnaces and forges.

How Importing Sugar and Molasses Helped

Shots and guns, bells, anchors and nails, all necessities arising from fishing and shipbuilding, were supplied by the iron makers of Massachusetts. The prosperity of fishing and commerce was reflected in the growth of iron manufacture, but commerce rendered the iron industry a service by bringing to Massachusetts raw materials that, in the process of refining, called for iron utensils. Chief among these imported crude products were sugar and molasses.[9] The settlement upon Massachusetts Bay and nearby Narragansett Bay became the centers for distilling because they surrounded the principal molasses importing towns, Boston, Salem, Newport and Providence.

The distilleries concentrated upon such a small area constituted a market for iron ware by reason of the fact that the pipes, kettles and stills were made from iron or copper. Likewise, the kettles for boiling crude sugar in order to purify it were of iron material. Commerce, too, was responsible for a large business in barrel making because not only were molasses and rum carried in barrels, but fish cargoes were put in the same kind of containers. All such barrels were held together with iron bands. Indeed, in 1795 one-half of the output of iron was devoted to this purpose.

The traffic in fish gave rise to another home industry conducted all along the shores of Massachusetts Bay and upon Cape Cod; the industry, namely, of deriving salt from sea water by evaporation. This practice required large iron drying pans. Hence iron manufacture was not only stimulated directly by fishing and commerce but also indirectly. Boats were held together by iron nails, navigated with the aid of iron bells, made secure by iron anchors or protected by iron cannon that fired iron shot. The very cargoes, too, carried by the ships were held in iron bands and rendered useful by iron utensils. Inasmuch as the largest direct and indirect markets for iron were connected with the fishing and commerce of Massachusetts, and furthermore, since these deep sea callings were most popular and most profitable in Massachusetts, it is natural that Massachusetts should lead in the manufacture of iron. Where the market was there also was iron made.

Market Made Use of Bog Ore Feasible

That the market was the principal agent influencing iron production in Massachusetts may be made clearer by a hasty survey of other possible factors. Fuel can be dismissed at once, for when Massachusetts was famous for iron (1650-1750) wood was everywhere abundant. Flux is usually easy of access where iron is produced, but eastern Massachusetts was lacking in lime bearing stones and the iron makers had recourse to marine shells[10] to supply the deficiency. Finally, eastern Massachusetts had no high-grade iron ore, although it was endowed with a poor variety known as bog ore, yielding from 25 to 50 per cent of iron.

As its name indicated, this ore is found in swamps or at the bottom of ponds; it lies from ½ ft. to 2 ft. deep, so a man in a boat working diligently with grappling irons or tongs can gather 2 tons in a day. The ore forms again in the same pond after an interval of twenty years,[11] hence one constricted area with a number of large ore-bearing ponds can keep a small scale furnace in continuous operation. For example, a pond at Middleboro, Mass., yielded 300 to 600 tons of ore a year for over 60 years. Despite the numerous deposits of this ore in eastern Massachusetts, the demands of the industry outran the supply of raw material, with the result that Massachusetts' furnaces were supported by ore from New Jersey, Pennsylvania and Maryland, and the refiners of iron imported rough bars from Russia. Homecoming trading vessels often carried scrap iron to Massachusetts as ballast. Therefore, the industry was not any more dependent upon local ore than it was upon fuel or flux; the market was the dominant influence. Since the principal market was in the maritime enterprises that centered in Massachusetts, there also the production of iron became localized.

This situation was unchanged until about 1750; all but one of the seaboard colonies (Georgia) possessed small local markets for iron and their needs were met by a forge in the neighborhood. Massachusetts alone had an iron industry whose market was sufficiently large to warrant a relatively large scale production. Beginning about the middle of the eighteenth century, however, settlements began to appear in valleys removed from the coast. There was repeated the history of the older eastern communities; local iron making at first supplied the newest local markets but at length well-recognized centers were established.

[9]The refining of sugar and the distillation of molasses into rum were two activities whose origin was in the extensive trade between Massachusetts and the West Indies. Raw sugar and molasses were carried from the islands by the American ships to their home ports. In response to abundant raw materials and a market greater than the production, sugar refining and rum manufacture flourished all along the shores of Massachusetts Bay. Rum, at that time, was an especially valuable product, in demand by farmers and sailors alike. Rum was as customary an article of a ship's stores as the sailor's biscuit or salt pork; in fact it was usual to allow for the operating expenses of a ship $92 to $275 a trip for rum, or as much as was allotted for bread. Inasmuch as the more southern colonies, notably Pennsylvania, turned surplus grain crops into beer and had no raw material for rum, the distilled spirit was an important article of commerce between the Atlantic colonies.

[10]This was no hardship, for oyster shells cost about 12 cents per ton of iron, whereas the limestone charge ran between 62 cents to $1.68 per ton of iron.

[11]Bog ore is precipitated from the water by minute infusoria gaillonella ferruginea, hence iron may be deposited as long as these minute animals remain active.

(To be continued)

Cleveland-Cliffs Improvements

The Cleveland-Cliffs Iron Co., Marquette, Mich., has let the contract for the construction of the new refining house at the North Marquette furnace, to replace the structure destroyed by explosion and fire a few weeks ago, to the Arnold Construction Co., Chicago, which also has the contract for the erection of the new shops, round houses, and other buildings that will go to make up the central plant of the Munissing, Marquette & Southeastern Railway, to be built near the Presque Isle dock.

Work on the refining building will begin in the spring, as soon as conditions are favorable and material can be delivered. Like the buildings for the M. M. & S. E. plant, it will be fireproof construction, concrete, steel and glass.

The Cleveland-Cliffs Iron Co. has made announcement of the letting of a contract for a $105,000 sawing and splitting mill for its furnace and chemical plant at Kipling, Delta county, Mich., which is under the same management as the North Marquette plant. Work on the new mill will be started in a short time, and will be pushed to completion during the summer months.

The Lakewood Engineering Co. of Cleveland announces the opening of a district office in Milwaukee, Wis., with Fred T. Kern and J. N. Young, formerly of Kern, Hunter, Inc., as its representatives.

FREIGHT RATE REVISION

Changes Will Follow Decision Not Favorable to Pittsburgh District

WASHINGTON, April 9.—Another revision of domestic freight rates on iron and steel articles in the Eastern part of the country is to be made on or before July 1 as the result of the decision handed down April 3 by the Interstate Commerce Commission in the case of the Pollak Steel Co. of Cincinnati against the Baltimore & Ohio and all the other railroads doing business in the territory east of the Mississippi and north of the Ohio and Potomac rivers.

In the Eastern export iron and steel case (43 I. C. C., 5), the commission permitted the cancellation of export rates on iron and steel articles from Pittsburgh, and related points to Atlantic ports, leaving in effect higher domestic rates, provided Chicago, Cincinnati, and other related points in the originating territory were given domestic rates on export traffic to the same ports adjusted on a specified relation to the rates from Pittsburgh. That investigation and suspension proceeding involved rates on export traffic only, but had in view the complaint of the Pollak Steel Co. in the present case which had then been filed and which assailed as unreasonable and unduly preferential to Pittsburgh domestic rates, carloads and less than carloads, for the transportation of billets, iron and steel articles taking billet rates, and iron and steel articles rated fourth, fifth and sixth class in the official classification, from Chicago and Cincinnati to Boston, New York, Philadelphia, Baltimore and points taking the same rates.

Steel Companies Intervened

Interests engaged in the manufacture and fabrication of iron and steel products, such as roofing and metal sheets, ingots, sheet bars, sheet iron, corrugated iron, wire and wire products, sheet steel and tin plate, wrought pipe, horseshoes, mule shoes, bridge and structural steel, at points within the switching limits of Cincinnati and at points in western Pennsylvania, Ohio, West Virginia and Kentucky were allowed to intervene. None of the intervening petitions enlarged the issues in the complaint, except that similar relief to that prayed by the complaint on behalf of Cincinnati and Chicago was asked for points in the Ironton-Ashland iron-producing section of Ohio and Kentucky. Among those intervening were the Carnegie Steel Co. and other subsidiary companies of the United States Steel Corporation.

Under the commission's decision just rendered rates from Chicago, Cincinnati, Portsmouth, Ironton and Ashland to New York and other Eastern points are to be brought into fractional relationship with the rates from Pittsburgh to the same destinations, whatever they may be. On the ground that Pittsburgh, under the class rate adjustment, takes 60 per cent of the New York-Chicago rates, the rate from Chicago, Cincinnati, Portsmouth, Ironton and Ashland are to take fractions of the Pittsburgh-New York rate, with 60 as the common denominator. That is to say, Chicago, on the class rate percentage adjustment taking 100 per cent of the New York-Chicago scale, is to take 100/60ths of the Pittsburgh-New York rates on iron and steel. Cincinnati, being an 87 per cent of the New York-Chicago scale point, is to take 87/60ths of the Pittsburgh-New York rate. The other points are to take 77/60ths of the base rate. These fractions of the Pittsburgh-New York foundation rate are to apply to billets and iron and steel articles taking billet rates and to all iron and steel articles rated at fourth, fifth and sixth classes.

The Pollak Steel Co.'s Complaint

The decision is in line with that written by the commission in the formal complaint of the Pollak Steel Co. against the export rates on iron and steel, issued six months ago. The fundamental holding in this latest case, which involves the domestic rates only, is that the rates from Pittsburgh are unduly prejudicial toward Chicago, Cincinnati, Portsmouth, Ironton and Ashland and unduly preferential to Pittsburgh. This finding has been made because while rates from Chicago, Cincinnati, Portsmouth, Ironton and Ashland have been strictly in accordance with the percentage basis of the New York-Chicago class scale, Pittsburgh rates have not. Pittsburgh is a 60 per cent point, but rates on billets and articles taking billet rates, and iron and steel articles rated fourth, fifth and sixth class, from that city to New York and other seacoast destinations have been on the basis of about 57.5 per cent of the New York-Chicago rates. Therein lay the prejudice against Chicago, Cincinnati, Portsmouth, Ironton and Ashland, which has now been condemned by the Commission and ordered by it to be removed on or before July 1.

The decision was written by Commissioner Meyer. It follows closely the tentative report made on the complaint prepared by an examiner who took the testimony in the case. The tentative report was submitted to all the parties in interest. The railroads and the Pollak Steel Co. did not file exceptions to it. The intervener, the Whitaker-Glessner Co., of Portsmouth, Ohio, excepted to the settlement proposed by the examiner because, if it were given 90 per cent of the present fifth-class rate, as proposed, its rate would be raised, on articles rated 90 per cent of fifth class, nine-tenths of a cent per 100 lb. That is to say, its present commodity rate on such articles is only 88.6 per cent of the fifth class rate. The recommendation of the examiner respecting Portsmouth was approved, notwithstanding that while that point takes 77 per cent of the New York-Chicago class rate, its commodity rate on iron and steel is 85/60ths of the Pittsburgh commodity rate, while the examiner's recommendation was that the rate should be made 77/60ths of the Pittsburgh-New York rate.

The Railroad Proposal

The railroads proposed that if it were found that undue preference for Pittsburgh existed they be allowed to remove the prejudice by raising the rates from Pittsburgh, Youngstown and Cleveland to the full fifth class basis and make the rate from Buffalo to New York the same as from Pittsburgh to New York. From points other than Buffalo they proposed to apply "split differentials." To Boston they proposed the regular port differential of 3c. from all points of origin other than Pittsburgh and Buffalo. They suggested a differential of 1.5c. from Buffalo and 2.5c. from Pittsburgh over New York.

The commission could see no reason for splitting the differentials. It therefore requires them to maintain 2c. under New York to Philadelphia and 3c. under New York to Baltimore. The differentials were established for use in connection with the class rates which are to apply on the articles in question. The commission therefore thinks the rates on iron and steel should not be an exception to the port differential rules.

Record Aluminum Output in 1917

The output of aluminum in the United States in 1917 is put at 180,000,000 lb. in figures recently collected, the compilation being based on an actual output in 1916 of 139,000,000 lb. In 1900 the output was only 7,150,000 lb. The increase has been progressive nearly each year, since, the 10,000,000-lb. mark having been passed in 1905 and 100,000,000 lb. practically reached in 1915 with an output of 99,806,000 lb. All except the 1917 estimates are U. S. Geological Survey figures.

Imports of aluminum have correspondingly declined. Those for 1917 were only 1,904,000 lb. as compared with 13,765,000 lb. in 1915 and a maximum for the last 17 years of 26,958,000 lb. in 1913. In 1900 they were 365,000 lb.

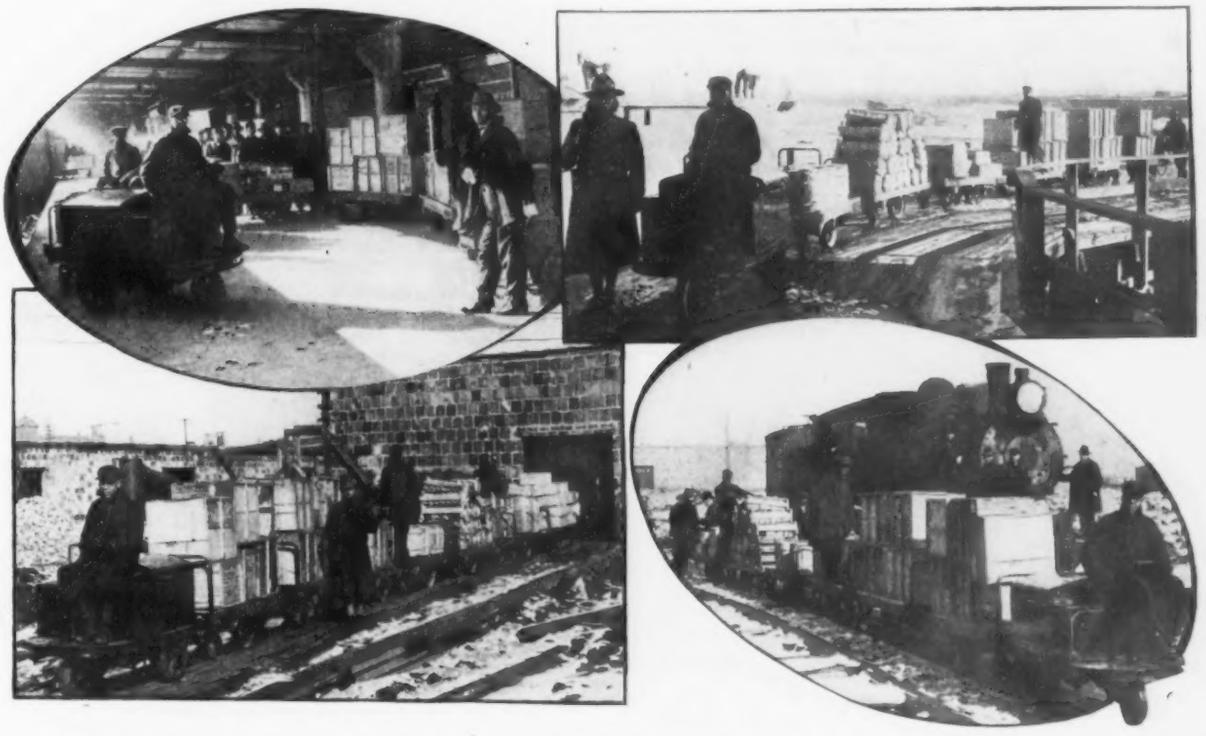
A National City Bank (New York) compilation puts the world's output in 1916 at 135,000 gross tons, against 91,100 tons in 1915 and 7200 tons in 1900. The output has been progressive since 1900, the 1905 production having been 11,300 tons and the 1910 output 49,100 tons.

TRACKLESS TRAIN EFFECTIVE

Transfers 200 Tons 1678 Ft. at Low Cost in Government Warehouse

The Army Quartermaster's Department, Chicago, was recently confronted with the problem of transferring 200 carloads of supplies from one Government warehouse to another, a distance of 1678 ft., and in the solution the Mercury Mfg. Co., Chicago, maker of what is termed the trackless train, or Mercury tractor system, finds reason for satisfaction. Railroad tracks were available, but cars were short. Delays were out of the question, for great quantities of material were arriving at the warehouse every day and room must be made. In addition, the cost of transporting such a quantity of material so short a distance by rail seemed excessive. The Mercury tractor system was used after consideration.

The tractors traversed 678 ft. through one building, then over a wooden tram 1000 ft. to the other building. The "right of way" was constructed of 2 x 6-in. pine planks, of sufficient width for two trains to pass each other. The approaches to the warehouses were on a 2 per cent grade, and the work was done when snow was abundant and surfaces slippery. The trailers which carried the supplies were pulled in trains of two to six at a time. After reaching destination the tractor dropped the trailers and pulled back to the other building a train of empties, or often a loaded train. On arrival at the first warehouse a train of loaded trailers was found ready for hauling, this arrangement making the operation practically continuous. The work was completed in four days.



Mercury Trackless Train Which Did Effective Work at Low Cost in Transferring 200 Tons 1678 Ft. in Government Warehouses at Chicago

Cost Figured at 8 4/5c. Per Ton

The Mercury company's officials, in figuring on the costs of the operation, found that it would cost approximately $4 per car to move the material by railroad, and as there were 200 carloads to be moved the total cost would have been about $800 by that method. Two men were required to handle each of the five tractor trains that were used, and as these were paid an average of $3 per day and it required four days to complete the job, the total labor charge was $120. To operate the tractors themselves it cost $2.50 per day each, or $50 for the four days, bringing the total cost that far to $170, as compared with $800, the estimate for railroad transfer.

Figuring 6 per cent interest on the investment in tractors, amounting to $5.64, and $2 for depreciation on a 20 per cent yearly basis, the final cost of handling the 200 carloads by tractor reached $177.64, and the total saving, as compared with the rail method, $622.36. The cost per ton by the tractor method was figured at 8 4/5c. In neither case was the cost of loading and unloading figured, as these approximate each other, with the trailers having some advantage.

The equipment used consisted of five type Z Mercury tractors, equipped each with 30 A-6 Edison batteries.

Methods for Analysis of Gases

A second edition has appeared of "Methods for the Technical Sampling and Analysis of Gases." The methods are those used by the United States Steel Corporation and are published under the authorship of J. M. Camp, chairman Chemist's Committee of the corporation. Largely because of the notable progress in the by-product coke oven gas field, an enlargement and revision of the first edition has been necessary. The first edition had also been exhausted. Except for the changes in the phraseology, the methods of the first edition for the analysis of the gases treated therein have been retained with but few changes of real importance. The use of a 10 per cent sodium chloride solution for sampling is recommended, and the measuring burette has been graduated and marked to read from the top downward instead of from the bottom upward, but it is evident that these changes affect the methods but slightly. As to the additions to the text, the method for the analysis of by-products gas is made as nearly as possible like that for producer and blast-furnace gases, but a method for the analysis of natural gas has been incorporated which differs slightly from that given for other fuel gases in that larger quantities for explosion are employed. This feature of the method is of decided advantage, because no error is introduced by the high percentage of resulting carbon dioxide. The committee appointed for the preparation of this revised edition was composed of the following: W. D. Brown, chemist, Duquesne works, Carnegie Steel Co.; Dr. J. R. Harris, chemist, Tennessee Coal, Iron & Railroad Co., and J. V. Freeman, chemist, central laboratory, Joliet works, Illinois Steel Co.

Iron and Steel Exports Decline Sharply

Unfavorable Conditions of February Reflected in Statistics for That Month — Heavy Imports of Manganese Ore

WASHINGTON, April 8.—All the adverse influences on trade movements which culminated in February are reflected in the official figures showing the exports of iron and steel during that month. Embracing as it did hardly more than a fortnight of working days because of the Garfield shut-down and other holidays, it was further marked by unprecedented railroad congestion, coal and labor shortage, a lack of cargo space for ocean transportation, and, finally, a rigid inspection of export licenses that cut off shipments aggregating many thousand tons. Under these conditions it is not surprising that there should have been a heavy decline in exports, leaving the record for the month below that of February, 1917.

The total exports of iron and steel by values in February fell 8.2 per cent below those of February, 1917, and no less than 34 per cent below the high record of December, 1917. Tonnage commodities declined 2 per cent as compared with February, 1917, and 34 per cent from the high mark recorded in December, 1917. Machinery, which for many months has maintained an upward tendency in spite of adverse influences, dropped 3 per cent from the record of February, 1917, and 40 per cent from the maximum figures of last October. Machine tools, which for nearly two years have shown a downward trend, dropped 50 per cent in February as compared with the same month of 1917 and 70 per cent as compared with May, 1916, when the peak of these exports was reached.

For the eight months ended February, 1918, exports of iron and steel by values showed a gain of 13 per cent over the same period of 1917. Tonnage commodities fell off 12 per cent, machinery rose 15 per cent, and machine tools declined 30 per cent. In considering the recessions from the records made in 1917, the fact must be kept in mind that the totals then recorded represented enormous increases over any preceding corresponding periods.

The value of all exports of iron and steel products

Exports of Iron and Steel

	February		Eight Months	
	1917 Gross Tons	1918 Gross Tons	1917 Gross Tons	1918 Gross Tons
Pig iron	49,018	....	572,005	....
Ferromanganese	....	a632	....	a3,513
Ferrosilicon	....	a592	....	a6,248
All other pig iron	....	a9,316	....	a297,446
Scrap	28,174	310	165,055	21,499
Bar iron	2,904	5,003	42,040	36,016
Wire rods	5,544	11,799	89,716	138,019
Steel bars	44,544	63,579	509,503	421,565
Billets, ingots and blooms, n.e.s.	131,566	173,272	1,225,682	1,358,519
Bolts and nuts	1,714	2,086	19,658	21,474
Hoops and bands	2,673	4,509	28,646	40,828
Horseshoes	161	189	3,078	7,727
Cut nails	167	233	3,320	3,182
Wire nails	5,707	8,699	90,901	85,396
All other nails, including tacks	1,988	748	11,930	9,850
Cast-iron pipes and fittings	5,211	6,706	51,032	56,759
Wrought pipes and fittings	8,231	8,157	121,796	75,854
Radiators and cast-iron house-heating boilers	516	128	2,140	2,208
Railroad spikes	2,639	367	12,866	11,300
Steel rails	46,153	35,586	421,864	289,717
Galvanized iron sheets and plates	5,455	6,165	60,505	54,263
All other iron sheets and plates	2,776	3,165	29,790	39,209
Steel plates	26,395	27,686	217,299	320,165
Steel sheets	6,031	14,565	71,806	113,774
Ship and tank plates, punched and shaped	....	a1,875	....	a22,454
Structural iron and steel	28,306	18,680	230,176	171,492
Tin and terne plates	14,632	18,564	142,591	143,848
Barb wire	16,460	6,282	247,449	117,620
All other wire	12,139	11,639	167,961	122,626
Total	449,104	440,532	4,538,909	3,994,571

a Not separately enumerated prior to July 1, 1917.

Exports of Machinery	February		Eight Months	
	1917	1918	1917	1918
Adding machines	$136,778	$133,981	$988,055	$1,462,002
Air-compressing machinery	63,591	92,277	750,534	875,277
Brewers' machinery	2,401	4,975	8,030	214,918
Cash registers	75,757	42,249	1,032,624	344,443
Parts of	9,291	932	92,399	44,172
Concrete mixers	.....	a7,853	.....	a191,012
Cotton gins	4,813	12,049	79,087	82,076
Cream separators	48,889	50,339	209,596	335,810
Elevators and elevator machinery	158,732	138,436	1,346,572	1,374,121
Electric locomotives	128,481	3,030	447,329	105,679
Gas engines, stationary	107,568	52,803	398,136	444,319
Gasoline engines	1,284,712	1,836,900	9,705,150	18,102,705
Kerosene engines	.....	a336,915	.....	a2,849,611
Steam engines	1,281,548	2,820,599	9,066,401	28,829,285
All other engines	364,739	402,252	2,658,729	1,615,133
Parts of	1,418,220	.....	13,424,126	.....
Boilers	.....	a104,077	.....	a2,785,358
Boiler tubes	.....	a319,101	.....	a4,528,252
All other parts of engines	.....	a964,467	.....	a10,924,356
Excavating machinery	.....	a36,012	.....	a616,507
Milling machinery, flour and grist	22,739	105,066	825,089	617,353
Laundry machinery, power	21,972	39,376	207,962	256,254
All other	28,410	11,894	229,201	194,274
Lawn mowers	12,565	2,694	108,885	157,052
Metal-working machinery (including metal-working tools)	6,642,827	.....	55,300,587	.....
Lathes	.....	a592,398	.....	a12,125,078
Other machine tools	.....	a752,355	.....	a7,259,966
Sharpening and grinding machines	.....	a328,879	.....	a4,279,216
All other metal-working machinery	.....	a1,434,799	.....	a16,869,546
Meters, gas and water	11,187	34,966	238,751	331,479
Mining machinery, oil well	44,982	88,905	1,367,028	1,321,887
All other	909,002	838,696	6,337,137	7,018,617
Paper-mill machinery	84,952	89,738	1,178,721	1,271,465
Printing presses	92,127	51,862	1,310,703	944,094
Pumps and pumping machinery	375,761	424,227	3,964,312	4,434,010
Refrigerating and ice-making machinery	50,285	112,359	503,913	996,460
Road-making machinery	.....	a34,707	.....	a309,812
Sewing machines	486,580	512,997	3,791,944	5,575,013
Shoe machinery	108,022	68,578	848,600	1,112,686
Sugar-mill machinery	514,224	751,269	8,999,209	9,619,545
Textile machinery	193,022	471,023	2,351,414	3,278,757
Typesetting machines	101,797	42,155	733,013	807,053
Typewriting machines	616,767	518,116	7,456,565	5,179,730
Windmills	30,843	63,576	496,452	838,800
Woodworking machinery, saw mill	27,849	88,794	311,796	622,500
All other	73,390	71,636	642,994	705,473
All other machinery and parts of	3,052,080	3,148,722	27,906,106	28,051,790
Total	$18,586,903	$18,039,364	$165,317,150	$189,902,943

a Not separately enumerated prior to July 1, 1917.

Imports of Iron and Steel

	February		Eight Months	
	1917 Gross Tons	1918 Gross Tons	1917 Gross Tons	1918 Gross Tons
Ferromanganese	6,379	1,417	55,735	17,252
Ferrosilicon	572	238	4,647	4,836
All other pig iron	306	1,780	30,907	15,978
Scrap	15,923	4,934	130,354	51,725
Bar iron	95	400	3,990	2,110
Structural iron and steel	12	117	676	6,658
Steel billets without alloys	475	2,450	4,268	28,328
All other steel billets	230	221	8,774	5,824
Steel rails	240	33	10,836	6,376
Sheets and plates	111	609	1,205	1,627
Tin and terne plates	35	32	553	32
Tin scrap	....	431	....	5,643
Wire rods	....	271	2,063	1,434
Total	24,378	12,933	244,008	147,823
Manganese, oxide and ore of	29,796	56,289	428,624	412,418

in February was $78,087,483 as compared with $85,117,010 for the same month of 1917, and $54,145,496 for February, 1916. For the eight months ended February, 1918, the aggregate was $778,357,754 as compared with $689,691,291 for the same period of 1917, and $355,111,065 in 1916. Exports of machinery in February were valued at $18,039,364 as compared with $18,586,903 for the same month a year ago. The highest total previously recorded was that in December, 1917, when machinery shipments were valued at $30,051,092. For the eight months ended February, 1918, the exports of machinery were valued at $189,902,943 as against $165,317,150 for the same period of 1917. Shipments of metal-working machinery in February aggregated $3,108,431 as against $6,642,827 for the same month of 1917. For the eight months ended February, 1918, the machine tool exports totaled $40,533,806 as compared with $55,300,587 for the same period of 1917. Details of the exports of machinery in February, 1917 and 1918 and for the two eight-months' periods are given in the accompanying table.

Exports of iron and steel for which quantities are given aggregated but 440,532 gross tons in February, 1918, as compared with 449,104 for the same month of 1917. Shipments in December, 1917, amounted to 656,044 tons and surpassed all previous records. For the eight months ended February, 1918, these shipments aggregated 3,994,571 gross tons as compared with 4,538,909 tons for the corresponding period of 1917. The accompanying table shows the exports for February and for the eight months ended February, 1918, as compared with 1917.

The imports of iron and steel in February, 1918, aggregated barely 50 per cent of those for the same month of 1917, amounting to 12,933 gross tons as compared with 24,378 tons. The general downward tendency noted since last July is reflected in the figures for the eight months ended February, 1918, the total being 147,823 gross tons as compared with 244,008 tons for the corresponding period of 1917. Imports of iron and steel and of manganese for February and for the eight months of 1917 and 1918 are shown in the accompanying table. W. L. C.

Large Manganese Ore Imports

Manganese ore imports in February exceeded all expectations, considering the attitude of Brazil and the shipping situation. They were 59,289 gross tons as compared with 42,947 tons in January and with 29,796 tons in February, 1917. The total for the eight months ended with Feb. 28, 1918, was 412,418 tons as compared with 428,624 tons for the same period in 1917.

The average for the first two months of 1918 has been 51,118 tons per month but it is estimated that the March receipts were not in excess of 25,000 tons, because of the withdrawal of shipping. The 1917 imports were 52,498 tons per month.

Bids will be received by the general purchasing officer of the Panama Canal, Washington, until April 12, under proposal 1211, for furnishing an electric steel furnace.

Metal Cutting Band Saw Machine

A metal cutting band saw machine in which the cutting band is lower than the returning band, thus making it possible to cut off any length required, is built by the Napier Saw Works, Inc., Springfield, Mass. The machine feeds into the work by gravity due to the balanced weight of the tilting head, and this marks a change from an earlier construction which involved the use of a channel framework for the head. The cutting band is supported by truss arms, each carrying a pair of roll guides. By means of the guides the band saw is directed so that its travel between the truss arms is vertical, thus to secure straight cutting.

The company recommends a speed of 80 revolutions of the driving pulley per minute in working soft steel, corresponding to 120 lin. ft. per minute of the band saw; 70 r.p.m. for cutting tool steel, with 100 lin. ft. per minute of the band saw, and 100 r.p.m. for soft metals, corresponding to 150 lin. ft. per minute of the band saw. The machine takes a 4 x 6 ft. floor space in

The Metal Cutting Band Saw of the Napier Machine Is Held Tilted to Cut Long Pieces

the size shown, which is capable of cutting 10 x 10-in. bars, and the saw is 12 ft. 4½ in. long and 1 in. x 0.035 in. in cross-section. The height from floor to the table is 26¾ in.

New Connections for Abell-Howe Co.

The Abell-Howe Co., 332 South Michigan Avenue, Chicago, has been appointed direct representative for the Standard Malleable Iron Co., Muskegon, Mich. for the sale of malleable castings through its several offices located at Chicago, Pittsburgh, Cleveland and New York. The Standard Malleable Iron Co. is particularly identified with the manufacture of malleable castings for railroad, motor vehicle and automobile use, in addition to its production of miscellaneous castings both light and heavy. The Abell-Howe Co. also has been appointed direct representative of the Northern Engineering Works, Detroit, builder of electric overhead traveling cranes, electric hoists, and foundry equipment, for the sale of these products in the general territory tributary to Chicago.

The Staten Island Civic League, 105 Stuyvesant Place, New Brighton, S. I., has submitted a plan to the Government for the construction of about 2000 houses along the North shore, to be used by workers at the shipbuilding plants in this section. It is said that about 8500 men are now being employed at the different works and that this will soon be increased to more than 12,000 men.

The Steel Base and Galvanized Sheets

Relation of Sound Metal to Large Spangles of Zinc—Effect of Titanium in Securing the Desired Results

A METALLURGICAL development of considerable interest to the steel industry and particularly to the sheet industry is the result of investigations made by the Titanium Alloy Mfg. Co. of Niagara Falls, N. Y. The details have just been made public in a monograph entitled "A Metallurgical Study of the Steel Base as Related to Galvanizing," written by G. A. White, the company's metallurgical engineer. The author's conclusions are that it is possible so to manufacture and treat steel as to insure a deposition of zinc on the sheets in the form of large spangles instead of small and non-uniform ones, with the added advantage of a less corrosive and more enduring product.

The object of the investigation is stated to have been to study, from a physical, chemical, microscopical and mechanical point of view, the composition and finish of steel sheets and the practice connected with their manufacture. It was undertaken because of the fact that some steel sheets fail to meet the purposes for which they are intended.

An examination of processes in the different operations resulted, Mr. White says, in establishing the fact that, while many grades of sheets are difficult to make, with a few exceptions the manipulation was not found to be at fault nor the operation so severe but that a good quality of steel, possessing proper physical structure and finish, would meet most requirements.

Examinations of numerous steel sheets that failed revealed the following faults: Segregation of material, due to wide variation in composition; poor physical structure and low physical properties, due to improper heat treatment; bad surface finish or coating, due to defective steel or poor finishing processes. Excellent photomicrographs are produced illustrative of good and bad sheets from actual service.

To get at the root of the matter, it was realized that the best quality of steel obtainable was necessary, and it was decided to ascertain the relative merits of the same heats of steel for sheets when handled as follows: Each heat in the molten state was equally divided; one portion was treated with ferro-carbon-titanium (2 to 3 lb. of titanium to a ton of steel) in the ladle; the other was given the regular standard open-hearth practice. Ten heats each of two grades of steel were made, low-phosphorous basic and rephosphorized basic, and the manufacture was followed throughout to the finished sheets.

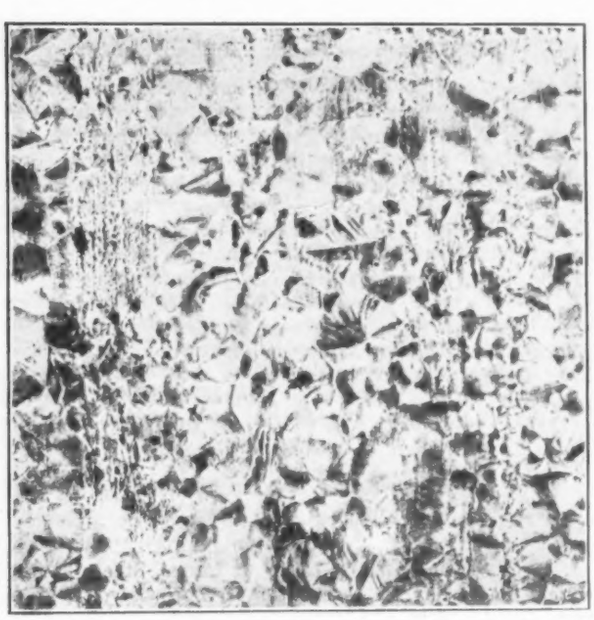
The heats were all carefully made from cold-charged material in stationary 50-ton furnaces. The ingots, after being poured in 18 x 20-in. open top molds were held one hour before stripping and were cooled from one-half to three-quarters of an hour in the air on casting cars before being charged into the soaking pits. The soaking practice was the same for all ingots. They were charged into the pits in the order in which they were cast so that an equal number of ingots of the regular practice and the titanium-treated steel were in the same pits. The ingots were heated in the soaking pits from four and one-half to five and one-half hours, when they were drawn out alternately and rolled under the same draft and number of passes on the blooming and bar mills.

A series of comparative tables gives the effect on segregation, bar-mill and sheet-mill department results. The per cent-ingot to bar and per cent-bar to sheet was in favor of the titanium-treated steel.

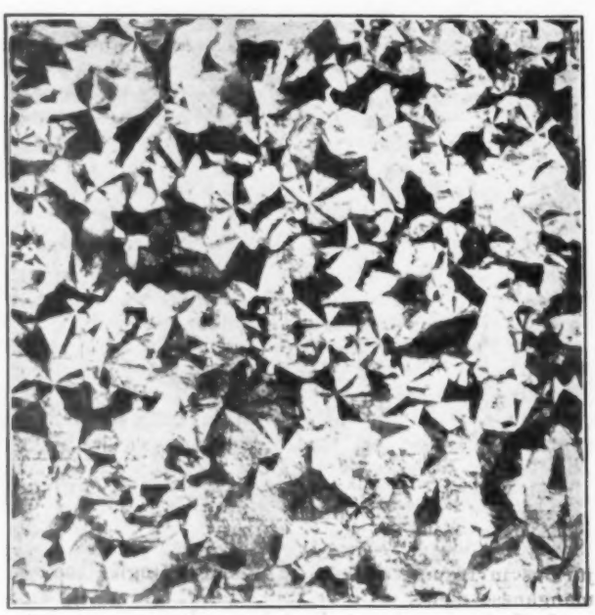
The striking feature of the investigation is revealed in the galvanizing process. Besides the marked differences in the physical properties of the sheet steel, the size of the spangles produced on the titanium-treated sheets as compared with those produced on the regular standard practice sheets is quite remarkable. The illustrations show the crystalline appearance of the zinc coat on galvanized sheets as it forms under normal conditions. One illustrates the large bright spangles becoming large fern crystals; another, the medium-spangled zinc coating, and the third, the small non-uniform spangle.

A table shows that of a heat from which 2700 galvanized sheets were made from titanium-treated steel and 2300 sheets from plain steel, 2110 of the former possessed the large spangle and only 382 of the latter. Two other heats gave similar results. The average loss of iron in pickling was about 50 per cent less in the titanium steel than in the plain.

The results of the conditions during galvanizing, says Mr. White, are such that, if the surface of the iron or steel base is very dense and smooth ,and the



Natural Size of Small Spangles on Galvanized Sheets



Natural Size of Medium Size Spangles on Galvanized Sheets

Natural Size of Bright Large Spangles in Galvanized Steel Sheets

heat conductivity on the whole is high, the zinc surface will cool slowly through radiation, resulting in large fern leaf crystals of zinc. If, however, the iron surface is rough and porous and contains cavities filled with gas or substance of a low heat conductivity, the surface of the zinc will cool more rapidly than does the iron base, so that many points of crystallization will form, resulting in small crystals.

Many other phases of the subject were investigated. The effect of hydrogen resulting from pickling was studied. The volume absorbed varies greatly in different steels. Mr. White claims that a series of tests showed that only 0.03 cu. cm. of hydrogen was set free per square inch in titanium-treated steel having large spangles as against 0.08 c.c. from basic open-hearth steel with large spangles, 1.05 c.c. from wrought iron with small granular spangles, and 0.80 c.c. from basic open-hearth steel with small granular spangles. One experiment showed that the immediate cause of small granular spangles in every case was the hydrogen gas that is taken up during the pickling operation.

The presence of slag and oxides also tends to prevent the formation of large spangles. The effect of the presence of manganese and sulphur is also extensively gone into.

The conclusions of this important investigation are given as follows:

1. The results obtained from a complete micrographical study of representative sheets of all samples confirm the conclusions given in previous pages of this report, and show that wherever small granular spangles of zinc are produced inclusions of foreign substances are seen between the junction line of the ferrite grains.

2. Steels which are abnormally high in manganese, manganese sulphide, sulphur and phosphorus, but which are in other respects of good quality, namely, free from dissolved gases and oxides, will galvanize with large bright spangles.

3. Steel containing a large quantity of iron oxide but with normal amounts of manganese will galvanize with moderate percentages of small granular spangles.

4. Steel containing a large quantity of oxide and also high in manganese or manganese sulphide will galvanize practically 100 per cent with small granular spangles. The amount of small spangles on the galvanized sheets from an oxidized steel is proportionate to the amount of manganese present.

5. In oxidized steels manganese sulphide is more injurious in respect to small granular spangles than is manganese alone.

6. High percentages of sulphur and phosphorus have in themselves no great influence in oxidized steel so far as small granular spangles are concerned.

7. Oxide of aluminum produced by adding metallic aluminum as a substitute for manganese as a dioxidizer has the same effect in the production of small granular spangles in sheets as manganese itself.

8. Although it is possible to burn the steel in both the soaking pit and various heating practices, we do not believe that this is an important factor in the production of galvanized sheets with small granular spangles.

9. From the results of many experiments and careful work done in the commercial mill operations, we are of the opinion that the factors that are active in the production of small granular spangles, otherwise known as gray sheets in galvanizing, have their origin in the open-hearth process; and that these causes can be eliminated only when sufficient care is taken to produce a steel substantially free from oxide.

Purchasing Agents to Standardize Catalog Size

A catalog conference has been called by the catalog committee of the National Association of Purchasing Agents. It is proposed to determine upon a standard size. The conference will be held on May 22 at the Hotel La Salle, Chicago. W. L. Chandler, Dodges Sales & Engineering Co., Mishawaka, Ind., is chairman of the catalog committee.

At the Pittsburgh convention of purchasing agents the size 8½ x 11 in. was tentatively adopted. The committee has had the matter up with 575 associations, representing various industries and trades, and 287 trade paper publishers. Quite a difference of opinion as to the best standard size is reported.

Some claims have been made affecting the proper size in part as follows:

That 90 per cent of the printers of the country now have no presses to take sheets larger than 32 x 44 in. To select a catalog which in order to run signatures of 16 pages would require sheets larger than 32 x 44 in. would result in throwing the catalog printing to 10 per cent of the printers or compel the 90 per cent to buy new presses.

That the size 7½ x 10⅝ in. is a logical one to produce from a sheet 32 x 44 in., running 16 on.

That the size 8½ x 11 in. has already been adopted by the American Institute of Architects as its standard and that a great many manufacturers are issuing catalogs on the basis of that standard. That some other associations, notably the gas interests, have been working on this same proposition and they have adopted other standards.

That the desirability of having catalogs the same size of letterhead is of considerable prominence. In this connection it is claimed that the size 8½ x 11 in. for a letterhead is not the most desirable size—that very few letters utilize the full sheet and that in the absence of the half size letterheads, which at one time were used, a great deal of paper is now wasted—that for somewhat the same reasons as apply to catalogs the size of letterheads should be 7½ x 10⅝ in.

It so happens it is explained that the size 7½ x 10⅝ in. comes within the range of what is known as the hypothenuse oblong. Any size sheet which comes within the scope of this hypothenuse is so proportioned that if it be cut in half the halves will still remain in the same proportion as the original sheet, and if those halves are again cut in half the same proportion prevails as long as the halving is carried out. All sheets within the scope of this plan are in proportion one to another. This has a value in printing booklets and things other than catalogs and at the same time retaining the same proportions in illustrations.

The catalog conference will be an open one.

The German Steel Syndicate Prolonged

The provisional renewal of the German Steel Works Union was recently agreed to by all the members except one company, the Konigs & Laura Steel Works, which made certain reservations. This company has now abandoned its objections on the understanding that this is the last time it will be required to do so, and the union has therefore been prolonged on the old footing up to Dec. 31, 1918.

Would Confer Great Power on the President

Output of Plants Taken Over by Government Could Be Sold to Citizens of United States and to Allied Governments—Early Action Expected

WASHINGTON, April 9.—A comprehensive authorization to the President, empowering him during the period of the war "in his discretion, and upon such terms as he shall deem expedient, through the head of any executive department, to sell any war supplies, materials and equipment heretofore or hereafter purchased, acquired, or manufactured by the United States to any person, partnership, association, or corporation, or to any foreign state or government engaged in war against any government with which the United States is at war," is embodied in a bill which has just been reported by the House Committee on Military Affairs with an urgent recommendation for its immediate passage. The original measure was drafted in the War Department, but has been amended by the House Committee so that any moneys received as the proceeds of any sales of material shall be covered into the Treasury and a report submitted to Congress instead of becoming available for disbursements for war purposes.

While the immediate objects of this legislation have been outlined to the House Committee by representatives of the War Department the enactment of the bill in its present form would confer upon the President far greater powers than have been suggested, powers of special significance in view of the development of the Administration's policy with respect to price fixing, commandeering of output and control of the production and distribution of the leading products of those industries contributing directly to the war or the general national welfare.

The Official Explanation

In an official explanation of the objects of this measure which will be embodied in the formal report of the House Committee, Judge Advocate General Crowder, who drafted the bill, states that it was framed to accomplish two distinct purposes: First, it was regarded as desirable, and indeed necessary, in the interest of the prosecution of the war, to be able at times to sell war supplies, material and equipment directly to those nations allied with us in the present war. This purpose, General Crowder adds, it is hardly necessary to enlarge upon in view of the extent to which our allies are now relying upon us not only for co-operation but as a source of many of the essentials of warfare.

The second purpose, which is not so clearly divulged in the language of the act, is regarded by the War Department as of equal importance. In making contracts for the manufacture of war supplies the department has frequently found that contractors lack a considerable portion of the machinery and other equipment necessary to make the goods desired. In these circumstances it has been found necessary under existing law to authorize the contractor to purchase the needed machinery at the expense of the Government and to provide in the contract that such equipment shall become the property of the United States. Experience has shown, however, that when machinery purchased under such conditions has served its purpose under the contract, the Government no longer has any use for it, and it will become necessary to sell it or lose its value. In the majority of instances, though not always, the contractor himself furnishes the most ready market for the disposition of it, and it would be an advantage if it could be provided in the contract that the machinery should become the property of the contractor upon the payment to the United States of a sum depending upon the use of the machinery by the contractor under contracts with the United States, the amount of such payment being reduced proportionately with the extent of the use of the equipment. This purpose of the proposed legislation cannot be carried out under existing law because of numerous technicalities in addition to certain specific enactments which make it necessary for Congress to authorize the executive departments to dispose of public property before the same can be sold, regardless of whether it has any further value for the purpose for which it was originally purchased.

Property Will Revert to United States

Since the United States entered the war hundreds of contracts have been made by the War and Navy Departments and the shipping board under the terms of which, in consideration of funds advanced by the Government for the purchase of equipment, the acquisition of land, the construction of buildings, etc., many millions of dollars' worth of such property will revert to the United States as soon as it is no longer required for military purposes. In some cases the Government will hold an option under which it will be able to take over the property or sell it to the contractors at a price agreed upon, but serious doubts have arisen as to the legality of such options inasmuch as they contemplate the sale of Government property without specific authorization by Congress. The passage of the pending measure would clear up all uncertainties of this kind and put the Government in position not only to handle to the best advantage property covered by the contract specifications referred to, but also to sell therewith other property which it might be advantageous to dispose of.

For example, in connection with the expansion of private plants for the production of ordnance and in the case of a number of shipyards, the Government has furnished the money to acquire sites and buildings as well as equipment. When the war is over it will be highly advantageous for the Government to be in position to sell such sites and buildings to the parties who may desire to purchase the machinery and other equipment which has been installed therein, and ability to dispose of the properties in their entirety will aid materially in obtaining a satisfactory price. In many cases, the officials believe, manufacturers will be glad to purchase complete plants where they would hesitate to acquire merely the equipment installed therein.

Still Greater Powers

The measure just reported, however, has an even broader scope than that suggested by the War Department, although certain officials of the Government are fully alive to its significance. It would enable the President, in the event that the output of any plant or industry should be commandeered or otherwise taken over by the Government, not only to sell such output to citizens of the United States and to the allied governments, but also to supply the purely commercial needs of the people of the allied nations. In no legislation heretofore suggested has there been any provision looking to the sale of material by the authority of the President to the citizens of the allied countries, although the question has been discussed in connection with the Pomerene steel price control bill. In the form in which the Pomerene bill was originally introduced, and even in the amendments suggested by the Federal Trade Commission, there has been no specific authorization covering sales to foreigners except for official war purposes, and even those terms which contemplate sales to the allied governments have been somewhat vague and indefinite. It will be seen, therefore, that the pending bill, if enacted in its present form, will constitute a broad basic measure directly related to any

price fixing or commandeering legislation that may subsequently be enacted.

It is understood that Chairman Dent of the House Military Committee has arranged with the leaders of the House for the early consideration of this bill and that the Senate Military Committee will also co-operate in expediting its passage. W. L. C.

Control of Pennsylvania Shafting Co. Passes to Latshaw Steel & Metal Products Corporation

The Latshaw Steel & Metal Products Corporation has purchased the controlling interest in the Pennsylvania Shafting Co., with mills at Spring City, Pa. The new officers and board of directors are: H. L. Latshaw, president and chairman of board; Willard Parker, vice-president and director; James Taylor, treasurer and director; R. Hueber, secretary and director; R. Grass, assistant secretary; Alfred C. Hermer, director.

Messrs. Latshaw, Taylor, Grass and Hueber own the controlling stock of the Pennsylvania Shafting Co., also have the controlling interest in the Latshaw Steel & Metal Products Corporation, and are reorganizing the Pennsylvania Shafting Co. with a view to putting it in full operation and securing capacity production.

For the present the general sales offices are transferred to 220 Broadway, but on May 1 larger quarters will be provided at 261 Broadway, which will become the general offices and sales department for both companies. The new Chicago office of the Latshaw Steel & Metal Products Corporation, in the Railway Exchange Building, will likewise be the Western sales office for the Pennsylvania Shafting Co.

Marvin W. Singer, vice-president of the Latshaw Steel & Metal Products Corporation, and in charge of its Chicago office, will represent the new organization in Chicago territory.

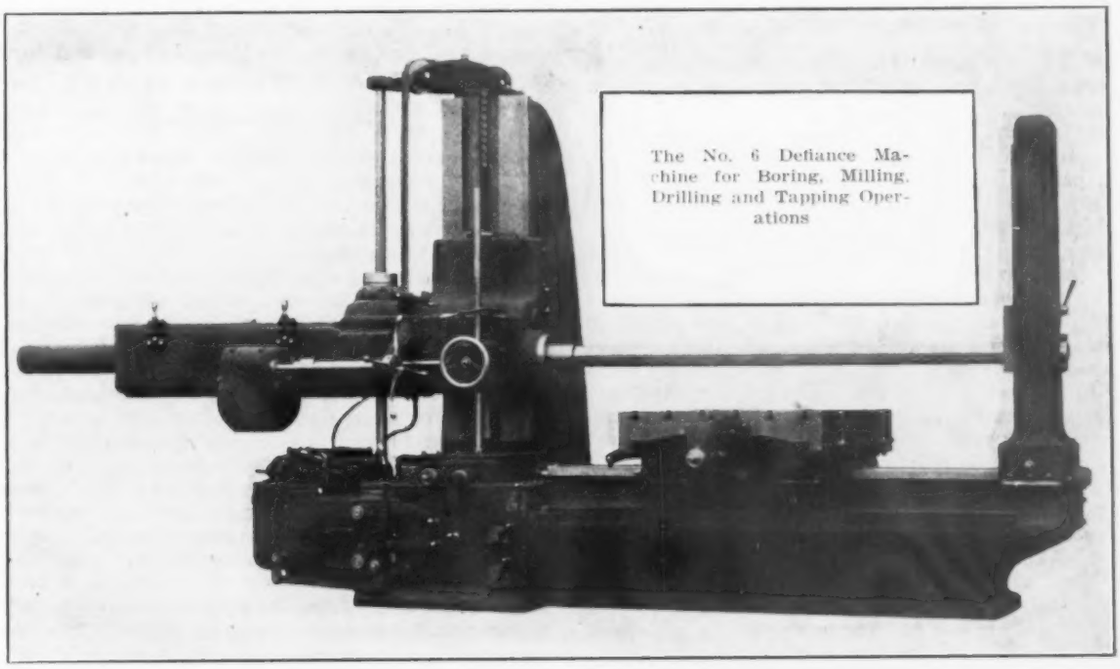
Plating Aluminum with Nickel

A process of nickel plating aluminum is announced as developed and patented by the United Smelting & Aluminum Co., Inc., of New Haven, Conn. It is said to follow closely the standard process of electro-plating other metals and is applicable to aluminum in sheets, rods, wire, tubing, etc., and to aluminum alloyed with other metals as in molded or die castings. It is claimed that nickel-plated aluminum presents a very hard, non-corrosive surface susceptible to a hard finish and that the plated article is much strengthened by the nickel. The process will also plate aluminum with silver, copper and other metals.

A New Defiance Machine

The accompanying illustration is a reproduction of a photograph of the No. 6 horizontal boring, milling, drilling and tapping machine built by the Defiance Machine Works, Defiance, Ohio. It has a 4½ in. diameter of spindle; the maximum distance from the face plate to the back rest is 7 ft., and the maximum distance from the top of the platen to the center of the spindle is 37 in. The platen is 36 in. square, and there are 64 in. of cross feed to the platen with automatic stop. There are ten speed changes from 7½ to 157 and twelve feed changes to all actuating screws and the spindle with a range of 0.004 to 0.5 in. per revolution of the spindle.

The spindle drive is through helical cut gears to give a smooth motion to the spindle, an essential in boring, and reversing is obtained with a clutch which is controlled by a lever convenient to the operator, making it possible to use the machine for tapping. The saddle is extended beyond the bed to give support to the platen at its extreme front and rear positions. To accommodate long work, the back rest may be taken from the base by removing four screws without disturbing any of the mechanism. The base may be adjusted along the bed by means of a rack and pinion, and the bed itself rests on the floor at three points. Hand adjustments are provided for movements of the spindle head, saddle and platen. The adjusting screws are provided with dials graduated to 0.001 in. to facilitate the production of accurate work. Moving parts are enclosed and oil tight, and forced lubrication is employed.



The No. 6 Defiance Machine for Boring, Milling, Drilling and Tapping Operations

A New Electric Furnace

A new electric furnace for making steel has been put on the market, covered by a patent (U. S. 1,252,633—Jan. 8, 1918) granted to C. H. Von Baur, Douglaston, N. Y., who is well known in this field. It involves the combination of a two-phase, three-wire circuit, three upright electrodes connected to this circuit, a solid bottom for the furnace and an oval-shaped side wall of refractory material. The electrodes are so spaced that at the slag line the heat gradient is the same for each electrode at the point of the side wall which is nearest to the electrode. Other features, such as the shape of the furnace and various arrangements, are explained in detail in the letters patent.

The Enterprise Foundry Co., San Francisco, has moved its offices from 2902 Nineteenth Street to the Southern Pacific Building.

Using Manganese Ore and Alloys in Sweden

Electric Smelting of the Ores to Make Ferromanganese—Pre-Melting the Alloy by Electricity Before Adding It to the Steel—Cost and Advantages

THE electric smelting of manganese ores to make ferromanganese was quite fully discussed by Joh. Harden of Stockholm, Sweden, before the fifth general meeting of chemists in Sweden last year in a paper, "Utilization of Manganese Ores in Sweden." Portions of the paper covering this phase of the subject, as well as the proper use of the alloy after it is made, are given below:

Methods of Smelting

For the production of ferromanganese the ores pyrolusite, MnO_2, and manganese spar, $MnCO_3$, are the chief materials. Pyrolusite has theoretically up to 63 per cent of Mn, and the spar 61.72 per cent MnO. Other ores, such as braunite, Mn_2O_3, hausmannite, Mn_3O_4, psilomelane, Mno_2, and rhodonite, $MnSiO_3$, are used with advantage. In some cases even manganese-rich slags are being used.

Before the introduction of electric furnaces on a larger scale, it was the practice to smelt the manganese ore together with charcoal and iron ore in blast furnaces. In this manner spiegeleisen was obtained, containing from 5 to 20 per cent Mn. The loss of manganese in the blast furnace, however, is very high, owing to the fact that the metal and its compounds are very volatile at high temperatures and a great deal is carried away mechanically by the blast, and a good deal of re-oxidation is unavoidable.

It is on account of these facts that the electric smelting method has been widely adopted and may under otherwise suitable conditions supersede the old method. This holds true especially in such countries as Sweden, where the supply of ore is rather limited and charcoal is becoming more and more expensive every year; wherefore the greatest economy with both is called for. The cost of power is, on the other hand, comparatively low, since power may be had for something like $9.70 per hp.-yr. or less, when taken in bulk, and this feature alone would almost be sufficient for a decision in favor of the electric furnace.

In addition to this stands the fact that the material produced in the blast furnace has always a very high carbon percentage, as a rule, from 8 to 12 per cent, and a higher carbon content always calls for a lower price on the market. It is true that a lower percentage of carbon also may be produced by careful handling in the shaft furnace, but in that case the losses are prohibitive, while in the electric furnace a product with lower carbon can be made at will without any excessive loss of material.

In practice also, a considerable quantity of manganese alloys other than ferromanganese are in demand, and these are hardly to be produced economically, if at all, except in the electric furnace.

Types of Furnace

Either single-phase furnaces with conductive hearth or 3-phase furnaces with or without the neutral point at the bottom may be equally advantageously used. When working on a large scale, the latter type, with the neutral point under the hearth, seems, however, to be mostly preferred for many reasons. The electrodes become smaller, the heat-distribution in the furnace is more uniform and the power regulation more even; also the tapping is less troublesome.

It is fortunate that ferromanganese has a comparably low smelting point, from 1250 to 1375 deg. C. (depending on the grade), wherefore it may, contrary to ferrotungsten, for example, be easily drawn off into molds, and is hence more easily broken up.

The furnace is charged with the proper mixture of ore, coal and flux at regular intervals; iron in suitable proportions is added as the ore requires. The iron should be added as scrap and not, as was formerly the practice, as ore, since the reduction of the iron ore consumes a good deal of power and may be more cheaply produced in the coke-furnace; besides, the iron ore is apt to upset the run of the furnace and is therefore less economical. Finally, the separation of the manganese from the slag takes place much more readily if the iron is added in the metallic state than if ore is added; hence a greater saving in material. Lime, quartz, etc., also are to be added, as the individual ores require, to insure good working.

The Power Consumption

The consumption of power is dependent on the following three factors, namely: The size of the furnace, the proper handling of the charge and operations, and, finally, on the desired percentage of carbon and silicon. As a basis for estimation, however, we may assume that a furnace with a capacity of about 3000 kw., 3-phase, properly managed, should not consume more than 8000 to 8500 kw.-hr. per ton of ferromanganese under normal conditions.

The furnace should be worked so that no open arc will occur. If this is not avoided great losses and a higher power consumption per ton will result. The charge must be kept so high in the furnace that the actual working zone is fully covered and the incandescent part of the electrodes nearly buried. The tappings must be timed with great care, and overheating of the metal must be studiously avoided. Any mistake in these directions will unavoidably result in bad economy.

The manganese easily forms double carbides of Mn-Fe and C. The manganese carbide proper, CMn_3, holds theoretically 6.77 per cent C and 93.23 per cent Mn. Ferromanganese, as produced in the electric furnace, will as a rule hold about 6 to 8 or 10.5 per cent carbon, depending on the manner of working. A typical analysis of the market product is:

	Per Cent
Manganese (Mn)	80.60
Iron (Fe)	11.93
Carbon (C)	6.41
Silicon (Si)	0.65
Phosphorus (P)	0.08
Sulphur (S)	0.026

A low content of silicon is always desirable. A much lower percentage than the one given above, down to 2 per cent and even under 1 per cent, can be obtained with adequate working of the furnace. Should such a low carbon be called for, it will as a rule be found much less economical to produce it in one operation, but far better to refine the product in a subsequent treatment. This operation is a rather difficult one and of course necessitates a larger power expenditure; hence the higher price for such material.

In the case of silico-manganese, a suitable quantity of quartz is added to the charge, reckoning with the amount of silicon which is usually volatilized as well. The finished product holds generally about 70 per cent Mn, 18 to 20 per cent Si and 6 per cent C.

A few special steels require an alloy particularly high in manganese, up to 98 or 99 per cent. Such material usually is produced by the thermit process, where finely divided aluminum is used as a reducer. In this way an alloy very high in manganese and low in carbon is obtained, but the product is also very expensive, on account of the high price of the aluminum. Also, although the method is very simple, it cannot be used on a large scale, as is obvious.

It is also possible to produce pure manganese by means of electrolysis of the molten oxide in a fluorspar

bath. According to G. Gin in France, only 3475 kw.-hr. per ton manganese would be required.

All such methods, however, have only a curiosity value compared with thermic smelting and probably will never be used earnestly on account of low production figure and high cost of plant.

Adding Manganese to the Steel

There is no doubt that up to recent times several mistakes were made when the alloy was to be added to molten open-hearth or Bessemer steel, especially when material high in manganese was to be made. If added direct in the Bessemer converter, the primary effect of deoxidation is certainly obtained, but during the subsequent finish blowing most of the free manganese will burn away or get lost, and the desired content in the steel will be very problematical.

If added direct in the open-hearth furnace, an uncertain quantity will at once enter the slag, and in each case an unavoidable loss of manganese will result. When this was recognized, the practice changed to the addition of the alloy in a crushed state, preheated sometimes, but still solid, into the ladle just after pouring. That method is still very much in use.

The consequence of this practice is, as a rule, that the ferromanganese will not, in spite of rigorous stirring, mix and alloy properly to its whole content with the liquid mass of steel in the ladle, but single particles will remain partly in a semi-fused state, whirling round in the mass, leaving behind a trail much like a comet's tail of manganese.

If such an ingot is cut in two lengthwise after it has cooled, it will be observed that these lumps form light spots, more or less prominent, as hard lenses in the steel. If the ingot is rolled out, these lenses elongate, forming the well-known "ghost lines," so called since they sometimes disappear and again turn up elsewhere.

Such ghost lines are, as so often recognized, very detrimental to the steel, especially for the milling or drilling. They are much harder than the surrounding part, which will cause the milling tool to make a deviation from the true cut, or else will ruin the edge of the tool in a short time. It has occurred more than once that a large delivery of otherwise excellent steel had to be rejected in bulk, and analysis of the spots has invariably shown that inferior alloying was the cause. Such occurrences are not apt to add to the credit of the firm apart from the economical losses in the direct way; in fact, it has recently brought about a costly lawsuit, in which the maker lost the case, as a matter of course.

The only correct way to avoid any such result is, therefore, to add the alloy in a liquid state at the right moment direct into the liquid steel in the ladle and stir properly. This, of course, does not pertain to crucible steel, where the alloying takes place under entirely different conditions.

The above fact was also clearly recognized in time by the more advanced steel makers, although the old method is still used in places. The question then arose, how to proceed to add the alloy in the molten state in the best way.

Pre-melting Manganese in Electric Furnace

The electric furnace was then adopted as being considered the best melting device for that purpose. For instance, at the Roechling works in Germany, where the author had several opportunities to follow the process closely as to economy and utility, the pig iron was drawn direct from the blast furnace and taken direct into the Bessemer converter, where it was blown down in about seven minutes. It was then tapped into a ladle, the right amount of ferromanganese, previously melted in a suitable electric furnace, was added, and a part of the charge was brought into an induction furnace and finished off as high-grade steel, while another part was treated elsewhere into a lower grade of steel for rails, etc.

As this procedure was repeated as often as every other hour and about 120 to 140 lb. of ferromanganese was added each time, it was necessary to provide for a suitable stock furnace for molten alloy only, which was always ready to deliver the adequate quantity of metal required.

A furnace specially suited for this purpose must be so designed that a very even supply of heat is provided, without the danger of accidental overheating or breakdown, which would lead to loss of material and disturbance of the whole series of subsequent operations. Oil furnaces have been used for the purpose with success, but, in Scandinavia especially, their demand for oil cannot be met, for obvious reasons. Besides the oil furnace requires wind, and in excess, too, in order to obtain the temperature required, which will lead to oxidation of a part of the metal.

The electric furnace is, therefore, especially in the countries mentioned, the most appropriate heating device, particularly if worked with indirect arc, or better still as an induction furnace. The latter type is doubtless more economical as far as heat efficiency goes, although the lining question may be more difficult to handle, inasmuch as the manganese, as is well known, possesses special cutting properties on linings. This difficulty can be satisfactorily solved, however, by the choice of right material and proper handling.

Messrs. Roechling were using either a normal 3-phase induction furnace or else a resistance furnace of a special design, which gave very good results, particularly the first mentioned. At another works a furnace with submerged arcs, somewhat similar to the Heroult furnace, but with three carbons (the Nathusius type), was used in another instance to be related here, which also worked satisfactorily.

Some of the figures given herewith are taken from *Stahl und Eisen* and others are the author's own observations on the spot.

The furnaces in question had a capacity of 3 tons and 1½ tons respectively, which in the former case was too large, but, as the result shows, the efficiency did not suffer much on that account. The power capacity was about 300 kw. when melting and 120 kw. for maintaining the heat after liquefying.

Heat Balance and Thermal Efficiency

In order to obtain reliable figures of the heat balance, the actual or specific heat of ferromanganese was first determined. For this purpose, a material containing 80.6 per cent Mn, 11.93 per cent Fe and 6.41 per cent C was very carefully melted and exact readings taken under proper conditions. The results of these observations are given in Tables 1 and 3.

Table 1—Specific Heat of Ferromanganese

Temperature, Deg. C.	Average Spec. Heat	Calories Represented by 1 Gr. Fe-Mn
600	0.1625	97.5
700	0.1667	116.7
800	0.1711	136.8
900	0.1763	158.6
1000	0.1822	182.2
1060	0.1863	197.4
1200	0.2133	255.9
1258	0.2225	280.0
1340	0.2268	304.0

Table 2—Heat-Balance Per Ton of Ferromanganese

Heat Supplied	Kw.-hr.	Per Cent	Heat Expenditure	Kw.-hr.	Per Cent
Electric energy supplied	833	100	Remelting heat	354.0	42.5
			Melting of the slag	7.4	0.9
			Losses		
			Transformer	33.3	4.0
			Leads	58.3	7.0
			Cooling water	50.0	6.0
			Radiation and conversion losses	330.0	39.6
	833	100		833	100

From the tables it will be seen that the thermal efficiency was only 43.4 of the heat supplied. This is probably to be accounted for by the fact that the furnace was too big (3 tons) for the charge and also that the time between rechargings was rather long.

This balance refers to the arc furnace. The corresponding figure for the induction furnace with a capacity of 700 to 750 kg. was 63.2 per cent, the conditions in that case being more favorable generally, as the charging could be done quicker and the heat insulation could be more effective. Also the losses in the leads, which are a heavy item, were eliminated. The charge was in both cases kept at a temperature of about 1350 deg. C.,

which is somewhat too high, but was necessary on account of the distance over which the metal must be carried.

Should a furnace be erected solely for this purpose, there is no doubt that it could be arranged so as to work with greatest economy, if all other uses were to be excluded.

Cost of Operation

The cost of operating the arc furnace for ferromanganese is given as follows. (The power cost was in round figures 0.02 of a shilling per kw-hr.)

Cost Per Ton Fe-Mn	Dollars
Power: 833 kw.-hr. @ 0.048c.	4.00
Electrodes @ $8.40 per 100 kg.	0.46
Labor costs	0.40
Linings and repairs	0.15
	5.01

Or, in round figures, $5 per ton of ferromanganese. This does not include the heat for the preliminary heating-up; while this by continuous working would throw the balance out of proportions, of course a small amount should always be added to this account, depending on the length of the campaign.

The corresponding figures for the induction or resistance furnace show about the same result, or a little lower, $4.68 per ton. As the electrode item is eliminated the costs should be less, but the maintenance of the lining costs a little more, hence the smaller difference in the sum total.

The heating up of the arc furnace after shut-downs and repairs costs as follows:

	Shillings
Power: 630 kw.-hr. @ 0.02 sh.	12.60
Coke and electrodes	5.50
Labor	2.10
	20.20

Or just over £1 ($4.85). The heating-up of the induction furnace cost 17s. 6d. ($4.20). The loss of manganese was in both cases very slight, or 0.385 per cent in the electrode and 0.360 per cent in the induction furnace, consequently of no practical account and need not be considered.

Molten and Solid Additions Compared

Comparative tests were also made to ascertain the advantage between the addition of molten ferromanganese and such added in solid, but preheated in oven. The result was as follows:

	Molten Ferromanganese				Solid Preheated Ferromanganese			Saving in Mn Added Liquid,
	Ingot Weight,	Actual Mn Used		Calculated Mn	Ingot Weight,	Mn Used		
Date	Kg.	Kg.	%	Kg. %	Kg.	Kg.	%	%
31/1	19,160	120	0.61	129 0.67	498,860	4,980	1.00	33
1/2	86,990	350	0.40	522 0.60	341,510	3,700	1.08	44
3/2	67,330	280	0.42	355 0.53	397,590	4,220	1.06	50
4/2	62,290	290	0.46	347 0.55	343,270	3,710	1.08	51
							Average saving:	44.3

If the ferromanganese is taken at the old price per ton, $49 per net ton, the costs and savings work out as follows:

	Dollars
Ferromanganese added solid	7.493
Ferromanganese added liquid	5.873
Sum total saved	1.620

Or, in other words, by producing 19,827 tons of ingots, a saving of £337 1s. 6d., or, in round figures, 4½d. ($0.09) per ton ingot.

This shows that an actual saving in material is the direct result of liquid addition, a fact which speaks for itself when large quantities are to be handled, especially now, as the price of ferromanganese is nearly five times higher than normal. A good brand, with a carbon of 5.5 per cent and low in silicon, is now costing even up to £75 ($365) per ton, while silico-manganese costs about £45 ($220) per ton, which should tell very markedly if a saving of something like 44 per cent is made when added liquid.

In addition to this is the fact of superior finished material, free from "ghost lines" and hard lenses. If this is rightly taken into account a secondary saving of great importance is made as well, which is not to be neglected since a rejected delivery may cost the works more than the value of the entire material in question.

Finally, the time-saving element should not be overlooked; if ready liquid alloy is really at hand, it is obvious that the finishing off of a charge goes much more rapidly and surely than if solid stuff is to be added, and this is of no mean importance to the total efficiency of the plant.

Taken in all, it seems as if the electric furnace has one of its largest fields in this direction at present, as no other melting device is so adaptable to this task and the immediate result is sure and certain. Of course, the prejudice of works managers and workmen alike must first be overcome, and, we fear, this is the most difficult side of it. It is much easier to design a serviceable furnace than to persuade steelmakers to use it and to handle it properly.

Large Ferromanganese Output in March —Available Supplies

The domestic ferromanganese production in the United States in March, according to the blast furnace reports of THE IRON AGE, was the largest but one of any month on record. It was 25,157 gross tons the next best record having been 26,591 tons in October, 1917. The spiegeleisen output from the same data was 13,965 tons, which is low as compared with some records in 1917, such as 23,079 tons in May and 22,947 tons in October. The following table gives the output for the first quarter of 1918 in gross tons:

1918	Ferromanganese	Spiegeleisen
January	22,793	8,202
February	17,428	10,925
March	25,157	13,965
Av. for first quarter	21,793	11,030
Av. per month in 1917	23,833	16,107

Detailed figures for 1917 were published in THE IRON AGE, Jan. 31, 1918.

The present situation as to available supplies is shown by the following table of output, imports and exports:

1918	Output	Imports	Exports	Available Supply
January	22,793	1,050	476	23,369
February	17,428	1,417	632	18,213
March	25,157	1,800*	500*	26,457*
Monthly average in 1917	23,833	3,703	...	27,457

*Estimated.

While the output of ferromanganese has declined slightly thus far in 1918 and while imports are less than half the average for 1917, the available supply is not seriously lessened in view of the fine showing in production in March. The unusually large manganese ore imports in January and February this year have caused the situation to be somewhat easier. They have been nearly equal to the record average of 52,498 tons per month in 1917.

For some reason spiegeleisen output has declined decidedly in recent months. This explains in part its present scarcity. The adoption of new standards and the greater use of low manganese ores should stimulate this production as well as increase the output of all manganese-iron alloys.

The American Association of Engineers is to hold a meeting at the City Club, Chicago, 315 Plymouth Court, on May 14, to discuss referenda which have been put to different technical societies on the question of the incorporation by the congress of the proposed American Academy of Engineers, to which Academy the American Association of Engineers is opposed. The association is also asking for a referendum on the extending of priorities to the transportation of equipment needed in drainage projects, and also a referendum on the matter of universal military training.

TRADE AFTER THE WAR

British Machine-Tool Builders Fear American and German Competition

Although the end of the war is not yet in sight, the machine-tool trade is giving more and more thought to the prospects for after-the-war business, and the impression seems generally to prevail that America's greatest business in machine tools and allied equipment for at least a few years following the war will come from foreign countries. Other countries are also expecting a large foreign trade in tools after the war, and at a recent convention of the Machine Tool and Engineering Association, Limited, of England this topic was thoroughly discussed.

The *Engineer* of London gives the following account of this meeting:

The question of the future of the machine tool trade was raised by J. Judson, of the Judson, Jackson Co. Arguing that the pre-war standard of profits of all machine tool makers was a low one, and that upon this basis excess profit taxation was being levied, Mr. Judson said that British machine tool makers would be in a bad position after the war to combat American and German competition. American firms in particular had amassed huge reserves during the war, owing to the fact that the prices of American machine tools had gone up tremendously in price, whereas British machine tools had not advanced abnormally. The following recent instances of American machine tool prices were mentioned, the figures being for machines delivered at Liverpool, less 2½ per cent, the profits included for the British merchant being those permitted by the Ministry of Munitions: Eight-inch center x 8 ft. bed. st. bd., q.c.g., D.B.G. lathe, £485; 25-in. cone pulley, B.G., sliding head drill, £134; 22-in. gear box drill, £115; 16-in. x 72-in. plain grinder, £895; 14-in. x 2½-in. floor grinder, £51; 6-ft. x 2-ft. x 2-ft. one-tool planer, £494.

He doubted whether any British machine tool maker was receiving half these figures for British-made tools, and they indicated the surplus which Americans would have to work with after the war. It was also necessary to reflect seriously on possible German competition. The Central Powers had been practically isolated for three years, and had, therefore, been compelled to manufacture all the extra machine tools they required. The Germans, therefore, would be more formidable competitors after the war than they had been formerly. Having regard to the importance of the British machine tool trade, it should be well financed, and those firms which had been eminently efficient before the war, and had low pre-war standards of profits, ought to be adequately recompensed, not only for their own sakes, but for the healthy prosecution and development of the industry after the war. The taxation of profits would leave British firms in a poor position to meet American and German competition, and yet we must take our standard of dealings from our competitors. If they traveled, we must travel; if they advertised largely, so must we; if they planned a given size lathe bed in 10 hours, so must we; if they machined a certain size pulley in 2 hours, so must we, and if they adopted more up-to-date machinery from time to time, we should have to do the same.

One of the speakers at the meeting in England thought that American manufacturers were prone to overrate themselves. "If an American firm," he said, "promised to deliver 1000 machines, it probably delivered 700, whereas an English firm would promise 700 machines and deliver 1000."

In the opinion of many men in the American machine-tool trade, whose views have been expressed to THE IRON AGE, there will be changes in American methods of selling abroad after the war. There will probably be less of individual efforts and more co-operation, especially by several manufacturers in non-competing lines. The question of the commissions or profits which foreign agents should receive is one of the most intricate that American manufacturers will have to solve.

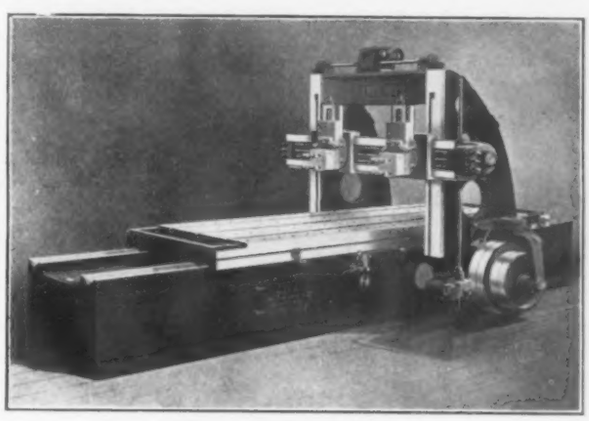
During the war thousands of machine tools have been bought in this country by the British and French war missions, and in these transactions the British and French agents of American companies have had no part, but they have, nevertheless, received their commissions. The question has arisen more than once as to whether this commission should be added to the price of the machines, or deducted from the manufacturer's sale price.

With regard to selling prices of American machine tools in foreign countries, a manufacturer says:

"Before the war American manufacturers sold machines to their foreign agents at a price f.o.b. New York or other shipping points, and the foreign seller added his own profits. Often this profit was excessive, as compared with the selling prices of such tools in this country, and undoubtedly American manufacturers have acquired in some countries a reputation as profiteers. This has not been helped any by the high prices which have prevailed throughout the war. After the war the reputable manufacturers must sell their tools abroad on the same basis as they are sold in this country—a fixed selling price whether sold by the manufacturer direct or through an agent, and fixed percentages for commission merchants. American manufacturers will need to give closer attention to the selling policies pursued abroad which affect their products, else American manufacturers will suffer in competition with British and German makers of machine tools."

The Liberty Planing Machine

The Liberty Machine Tool Co., Hamilton, Ohio, recently incorporated, has fitted up a plant for the manufacture of planing machines. The illustration shows a 36-in. planing machine that has been designed by the maker to meet the requirements of modern practice and



Independently Adjustable Feeds on the Cross Rail or the Side Head Enable the Operator to Change the Feeds of This Planing Machine While It Is in Motion

to include all necessary safety appliances and conveniences for the operator. The patented feed is independently adjustable on either the cross rail or the side head, and thus the operator may change the feeds while the machine is in motion. A direct reading index dial conveniently located enables him to set the feed readily to any required amount.

The top of the bed between the V's, except through the gearing section, is closed, as indicated in the accompanying illustration. All gears are placed inside of the bed but are easily accessible from the top. They are pressed on the hubs, thus to relieve the shafts of torsional strains. Wick oiling bearings are provided for the heavy shafts. The driving pulleys are of aluminum. The loose pulleys have a solid web center which tends to protect the operator against accidents. The elevating device is centrally located on the top brace and is operated by a long handle on the side of the housing. All gears are idle when not in use.

The Smith Gas Engineering Co. will start manufacturing in its new plant at Moraine, Ohio, near Dayton, on or about April 15. The main building is 110 x 420 ft., and is now being equipped with modern tools for the manufacture of the Smith gas producers. The company's plant at Lexington, Ohio, will continue in operation, but shortage of labor made it necessary to locate additions elsewhere. The main offices of the company will be located at Dayton, Ohio.

SCIENTIFIC STEEL METALLURGY

Progress in Alloy Steel and Heat Treatment—Co-ordinated Results Important

AN interesting historical discussion of the present position of scientific steel metallurgy was presented before the Sheffield (England) Society of Engineers and Metallurgists late in January by Professor Arnold. He started with the middle of the nineteenth century, inasmuch as about 1855 Bessemer patented his pneumatic process and about 1858 Mushet patented Mushet steel. The unusual features of these patents were that both were workable by those intelligently skilled in the art of steelmaking. In addition Mushet also patented the deoxidization and recarburization of nearly pure fluid iron by ferromanganese or spiegeleisen.

Professor Arnold confessed that, although ostensibly a scientific steel metallurgist, he had an unaltered admiration for the past achievements of the rule-of-thumb man, who has rendered and is still rendering invaluable help to the scientific steel metallurgist. His rule was to listen with profound attention and respect to verbally presented records of the practical observations of the unscientific steel metallurgist, but to ignore his theoretical scientific explanations of the phenomena observed.

Lack of Co-ordination in Results

During his historical researches on the scientific development of steel metallurgy Professor Arnold has been struck by the bad but subconscious practice of observers engaged in one line of research on steel metallurgy never reading results obtained by others in co-ordinate researches on the same subject. Hence one finds in the 'eighties and early 'nineties a puzzling jumble of facts and theories due to the complete lack of any correlation of the researches then proceeding. For instance, Abel in 1885 proved conclusively at a meeting of the Institution of Mechanical Engineers in London that the carbon in very pure steel, namely, hammered and rolled blister bar, existed totally as Fe_3C, and in the same year Osmond and Woerth showed that the carbide in annealed steels could be isolated galvanically in the form of bright metallic spangles or plates. Although Sorby from 1863 onward had from time to time described to the Sheffield Literary and Philosophical Society and the British Association for the advancement of Science his micrographic work on iron and steel, it was not until 1886 that he fully described to the Iron and Steel Institute the nature of the pearly constituent he had discovered long before. But it appeared that he was unacquainted with Abel's discovery of 1885, and hence was not in a position to realize the vital correlation of his microscopical discovery with that of Abel obtained by chemical method.

In 1894 Arnold and Read in a correlative chemical and microscopical research read before the Chemical Society a paper which proved that the laminæ in Sorby's pearlite were identical in chemical composition with Abel's carbide of iron Fe_3C. Further, in 1895 Arnold read before the Institution of Civil Engineers in London a research on the influence of carbon on iron, in which the saturation point of steel was described, showing that pure iron containing 0.89 per cent of carbon consisted entirely of Sorby's pearly constituent of alternating plates of soft Fe and hard Fe_3C. In other words, the quantitative composition of pure pearlite had been discovered, and the work of Abel and Sorby indissolubly linked together. An interesting point to recall was a systematic research on steels containing from about 0.1 to 0.96 per cent carbon made in the early 'nineties by Arnold and Read which confirmed Abel's results for all percentages of carbon in this range. This paper was all but rejected by the Chemical Society on the ground that their experts could not realize the possibility of the existence of a carbide of iron.

The enormous advances in the scientific metallurgy of steel are at the present time illustrated by the numerous alloys of steel with tungsten, chromium, molybdenum, vanadium, and nickel. Among this great variety sometimes only a single element is used, but more often two or more such elements are employed. In fact the duties of the modern steel chemist require a very great knowledge of applied chemistry, because the elements possibly found in steel now number about 20. In spite of this more and more researches are being made such as the influence of silicon, titanium, cobalt, uranium, tantalum, and even zirconium. It is a very curious fact that the marvelous influence of minute quantities of aluminum in checking segregation and preventing blow-holes is still a mystery in spite of many researches.

Striking Effect of Manganese

Investigations on the influence of elements in rising increments on nearly carbonless steel present almost invariably unexpected results of great theoretical interest and possibly of practical importance. A research of this kind made with nearly carbonless iron and manganese has not yet been fully published, but the results are almost astounding. From 1 to say 1.7 per cent manganese, the metal improves the iron, but further additions of manganese, say from 2 to 10 per cent, cause the elongations to fall, till with 10 per cent manganese it registers only about 12 to 35 per cent. The alloy gradually assumes a yellow color of pale brass and registers a rising elongation, till with about 30 per cent of manganese the maximum stress approximates 43 tons with an elongation of over 60 per cent.

Open-Hearth Displacing the Bessemer

One of the most remarkable developments of the acid steel industry began in the early 'eighties, consisting in the replacing of the Bessemer converter by large acid open-hearth furnaces. The reasons for this change are several. The Bessemer process, when employed to produce the highest classes of structural steel, requires a much more exacting scientific control than is the case with the open-hearth furnace, in which regular results are more easily obtained. The large open-hearth furnace compared with the Bessemer has a greater output combined with economy in production. Also the open-hearth furnace consumes large quantities of discards and other forms of scrap. Again the Bessemer process requires much larger manganese additions than those necessary in the open-hearth process. Nevertheless for certain purposes well-made special acid Bessemer steel is still capable of holding its own with the product of the open-hearth furnace. In Professor Arnold's experience the high manganese, say 1.2 per cent, advisable to get the best results for certain purposes, though rendering the steel unsuitable for boiler plates owing to rapid corrosion, was very valuable for many heat-treatment purposes, a fact which has never yet been fully realized.

In the early 'eighties the open-hearth furnace was in a distinct minority in Sheffield. To-day in Sheffield proper there are only four vessels of the old type of Bessemer converter extant. In 1879 Sheffield was one of the world's largest Bessemer rail centers. To-day old Sheffield does not roll any rails at all. The industry for economic reasons has migrated to the coast.

Advance in Heat Treatment

A great scientific advance has been made during the past few years in the art of heat treatment. Very high elastic limits associated with good ductility and resistance to shock are obtained from ordinary and alloy steels by oil and water quenching from a red heat and subsequent letting down in air at an incipient red heat. For instance, from steels fairly low in carbon, elastic limits of over 50 tons are obtained, associated with elongations of about 20 per cent. The only clue we have obtained from the microscope is that these remarkable results are associated with fineness of texture, particularly with reference to the state of division of the carbides. In the lecturer's opinion this fineness of division *per se* does not give an adequate explanation of the results obtained. There is some unknown cause, dependent no doubt on the state of the

division, which is not understood. Dr. Thompson of Sheffield University has put forward a theory based on surface tension effect which is worthy of close consideration and research. For over half a century a fascinating but futile subject of research has been the production of wrought iron and steel direct from oxides of iron without a preliminary smelting of the ore in the blast furnace.

The Direct Process

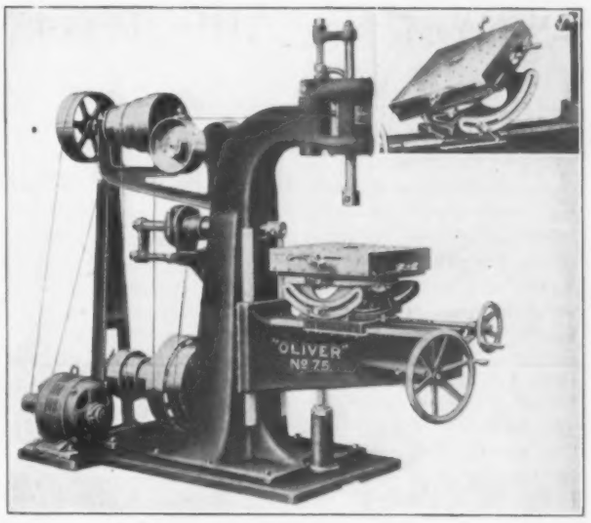
Various schemes, generally of a complicated nature, have been tried with consistent failure, until to-day the very name "direct process" stinks in the nostrils of ferro metallurgists. From about 1909 to 1913 the lecturer had helped to develop a direct method known as "The S. and O. Process," originally designed to deal with hitherto useless magnetic iron sands which, although containing from 50 to 55 per cent of metallic iron, were nevertheless useless because high in phosphorus and very high in titanium. The finely divided state of these sands also precluded any attempt to deal with them in the blast furnace without briquetting. On a small scale, involving heats not much exceeding a ton, after many experiments the iron sands of Java and New Zealand were successfully dealt with by this method. The results obtained some four or five years ago from Java sand were given by the lecturer, who also described the apparatus used. More recently, successful results have been obtained with low-grade British ores. A plant for demonstration purposes, capable of an output of 150 tons of steel per week, is under construction at Wandsworth.

Wood-Milling Machine for Pattern Shops

A wood-working machine designed to occupy the same place in the pattern shop that a milling machine does in the toolroom has been brought out by the Oliver Machinery Co., Grand Rapids, Mich. It is intended for handling all classes of special and irregular patterns and practically all of the operations encountered in the general run of pattern shop works can be accomplished with the cutters that are regularly furnished with the machine or with special ones that can be made when necessary.

The machine is motor driven and variations in the speed of the spindles are secured by the use of cone pulleys. Both vertical and horizontal spindles are provided, together with a universal tilting table mounted upon a knee which can be raised or lowered. An adjustable lock nut is provided on the lead screws parallel to the spindles as an aid in securing duplicate work. Both of the spindles are 1⅞ in. in diameter in the sleeve and have a 3-in. head to take cutters having a No. 4 Morse taper. The spindles are hollow to enable draw-in rods to be employed in connection with fly cutters and a handwheel and spiral gear acting on a double square-thread large-diameter screw controls the spindle travel within the limit of 10 in. for the vertical spindle and 11½ in. for the horizontal one. Extremely fine control of the cutting tool is secured by micrometer adjustment on both handwheels and cutting to any given depth is secured by a stop lock nut on each spindle control screw. The center line of the horizontal spindle is 14 in. above the table, with the latter in its lowest position, and the vertical spindle center is 18 in. from the face of the column and the end is 24 in. above the table when both are at their extreme positions.

The table, which is 20 in. square, is divided into 1-in. squares by etched lines, and tapped holes are provided for attaching the clamps for holding the work in place. A disk 3 in. in diameter at the center of the table can be removed to permit boring to be done below the line of the table without injury to the tools. The table swivels on ball bearings through a complete circle and can be locked at the 90-deg. points by a positive lock. It can be tilted to 45 deg. on either side of the horizontal and the cross feed which has a travel of 12 in. is secured by a screw and ball crank lever capable of operation from either side of the table. A positive centering device is relied upon to locate the center of the table directly over the ball-bearing swivel center for circular work and where the work revolves two centering plugs ½ and 1 in. in diameter respectively are furnished.



A Great Variety of Operations in the Pattern Shop Are Made Possible by a Wood Milling Machine Equipped with a Universal Tilting Table

The knee is of the box type, with a closed top, an arrangement which is relied upon to prevent chips from interfering with the raising mechanism. The table will travel toward and away from the column a distance of 17 in. on horizontal planed ways, rapid traverse being provided by a large square thread screw and hand wheel. A centrally located telescoping screw enables the table to be raised or lowered a distance of 21 in. and also furnishes additional support to the knee. This movement of the table is controlled by a hand wheel and a zero line on the horizontal ways provides a means by locating the table exactly in line with the vertical spindle easily.

Westinghouse Interests Advance Wages

The Westinghouse Air Brake Co., Wilmerding, Pa., and the Union Switch & Signal Co., Swissvale, Pa., the latter a subsidiary of the former, have notified employees of an increase in wages. In each of the plants, posters to that effect, signed by A. L. Humphrey, president, were posted last week. The advanced rates date from April 1, and are as follows:

Airbrake and Switch and Signal Plants

All piecework rates and day rates will be increased 12 per cent. All piecework employees working overtime will be paid 15 cents an hour in addition to their piecework earnings.

All regular night-turn employees will receive 10 per cent above regular day and piecework rates.

All salaried employees' rates at less than $200 a month will be increased 7 per cent on original rates.

All payments heretofore made in the form of bonuses will hereafter be included in the original rates. The last payment of bonus earned to March 31 will be included in the regular pay on April 8.

Aircraft Division of Switch and Signal Works

All piecework rates and day rates will be increased 10 per cent. All piecework employees working overtime will be paid 15 per cent an hour in addition to their piecework earnings. All regular night-turn employees will receive 10 per cent above regular day and piecework rates.

Voluntary enlistment is now being urged in the 27th Engineers, National Army, to be composed of experienced miners. Besides the direct mining qualifications which need to be met, there are places open for tool sharpeners, electricians, machinists, surveyors, time-keepers, etc. Enlistment may be made with the nearest recruiting officer and under certain conditions men in the draft age are eligible. The regiment is now located at Camp Meade, Md.

New Plan Adopted by War Industries Board

Chairman Baruch Given Much Greater Power, Having Control of Production and Distribution of Commodities Necessary in War's Prosecution

WASHINGTON, April 9.—A comprehensive plan to prevent confusion and conflict in the ordering and delivery of supplies and to secure unification of the Government's policy in dealing with industrial problems has been adopted by the War Industries Board. The essential change involved in the redistribution of functions now undertaken is the creation of a Requirements Division which will serve as the central directing agency in the machinery of the War Industries Board. The effect of this reorganization is to greatly expand the authority of Chairman Baruch and to place in his hands the control of the production and distribution of practically every commodity essential to the prosecution of the war.

The formal statement issued by the War Industries Board cites the words of the President's letter appointing Mr. Baruch to the effect that the chairman of the board "should be constantly and scientifically informed of all contracts, purchases and deliveries in order that he may have always before him a schematized analysis of the progress of business in the several divisions of the Government in all departments." The Requirements Division will be the agency to which this information will be furnished and to which the supply divisions of the purchasing departments and the Allied Purchasing Commission will "as far in advance as possible" submit statements of their "respective needs" for raw materials and finished products. The Requirements Division will in turn delegate the task of fulfilling these needs to the special commodity divisions of the War Industries Board, to the supply departments themselves, or to such other agencies as may be decided upon.

Many Commodities Included

The statements furnished the Requirements Division by the several supply divisions of the departments will include not only commodities in which a present or threatened shortage exists, but also those in which the supply is ample and will include commodities required by one department only as well as commodities required by several different departments. In the procurement of supplies in which no shortage exists and where no allocation seems necessary or desirable, the Requirements Division will so advise the department, presenting the requirements, which will thereupon proceed with the purchase in pursuance with the established practices. That is, in pursuance of the President's directions, the War Industries Board will "let alone what is being successfully done and will interfere as little as possible with the present normal processes of purchase and delivery in the several departments." At the same time, having complete information as to the progress of the departments, furnished through the Requirements Division, the chairman of the board will have at his disposal complete information to guide him in the determination of general industrial policy.

Systematic Allocation

Speaking generally, the requirements of both the American Government and the Allies can be met satisfactorily if orders and deliveries are given systematic allocation according to the relative urgency of the needs of the various departments demanding them. Shortage in materials is very frequently found on analysis to be not actual but rather the result of badly planned distribution. With complete information at its disposal, the Requirements Division under the direction of the chairman of the War Industries Board will be in a position, through the several sections of the board, to "guide and assist the departments" through proper allocation of materials, or at its discretion to leave particular tasks to the exclusive jurisdiction of the departments involved.

To take charge of particular problems of supply, there have been created special commodity sections, and whenever necessary to handle raw materials or finished products of which there is an actual or threatened shortage, or the price and production of which should be controlled for the protection of the United States Government, the Allies, or the civilian population, new sections will be created by the chairman of the War Industries Board. Each of these sections will be charged with the responsibility of collecting from the several departments of the Government, from the manufacturers and producers and from committees representing them, and especially from the War Service Committees created under the supervision of the Chamber of Commerce of the United States, and from any other reliable sources concerning the production of the particular commodity with which the section is charged, this information to include available supplies, new sources of supply, methods to increase production, etc.

Sole Government Agency

It is the purpose of the chairman of the War Industries Board to make each of the section heads the sole Government agency for dealing with the industry for which his section is responsible. For example, questionnaires have hitherto been sent out to the same industry from many different departments, often asking the same questions and causing needless confusion and needless effort to the business men in these industries. It is the purpose of the chairman of the board to centralize in each of these section heads all such tasks as the issuance of questionnaires and all other means of gathering information about the industries which each section head has in charge. Through these section heads, therefore, all data and information about particular industries will be focussed, and in their offices it will be at all times available to the several interested departments, to the Price Fixing Committee of the War Industries Board, to the Priorities Division of the Board, and to any other agency that may be designated by the chairman of the War Industries Board. It is hoped thus to do away with much of the confusion that has apparently existed in the minds of business men as to the agencies through which they are to deal in furnishing information to the Government.

Will Anticipate Needs

In accordance with the President's letter, therefore, the chairman of the board hopes through the creation of the Requirements Division "to anticipate the prospective needs of the several supply departments of the Government and their feasible adjustment to the industry of the country as far in advance as possible," and "to guide and assist wherever the need for guidance or assistance may be revealed."

In practice the general plan of action of the new organization is about as follows:

The Requirements Division is composed of representatives of the various sections of the War Industries Board, including the Priorities Division; representatives of the Army, the Navy, the Emergency Fleet Corporation, the Food Administration, the Red Cross, the Railroad Administration, the Fuel Administration, and the Allied Purchasing Commission.

Statements of "prospective needs" as mentioned above will be presented to the Requirements Division as far in advance as possible by the member or members thereof representing the agency in which the requirements originate. The Requirements Division will then refer specific problems to the proper commodity

sections of the War Industries Board for the consideration and solution of the problem of supplying them. On each commodity section there will be representatives of each of the supply departments of the Government interested in the commodity in question.

Will Study Problems

The chief of the commodity section will study the problem referred to his section by the Requirements Division, and will procure from all available sources, including the supply departments, information and data which will be helpful in the allocation of these requirements. At meetings of the commodity section the allocation of materials or facilities to meet the requirements will be determined, and in this distribution the representatives of the various supply departments of the Government who are members of the section will have full share.

If any member of the commodity section is dissatisfied with the decision, he may, if he wishes, file a protest with the section head and also with the head of his division or department. Then if, for example, he belongs to one of the supply departments, his chief may appeal for reconsideration to the War Industries Board, whose decision will be final, subject only to modification by agreement between the chairman of the War Industries Board and the respective Secretaries of War and the Navy, and the chairman of the Shipping Board, whichever may be the one interested in the subject.

In addition to dealing with problems referred to them by the Requirements Division, the commodity sections will have certain definite functions. The first will be the collection of information regarding industrial conditions already mentioned. Further in pursuance of the President's directions to the chairman of the War Industries Board, they will consider from time to time the extent of the existing sources of production, the creation of new facilities, and the disclosure, if necessary, the opening up of additional sources of supply, and the conversion of existing facilities to new uses.

Market Conditions

Each commodity section will consider market conditions pertaining to the materials or commodities over which it has jurisdiction, and will, where deemed advisable, recommend purchase plans to the several purchasing departments. In cases where it becomes necessary to control an industry in whole or in part by means of allotments, the appropriate section will determine the allotments of materials, commodities and facilities to the several departments of this Government and to its Allies, and also the extent to which manufacturers and others, whether serving the civilian population or engaged in the manufacture of war supplies, shall be supplied.

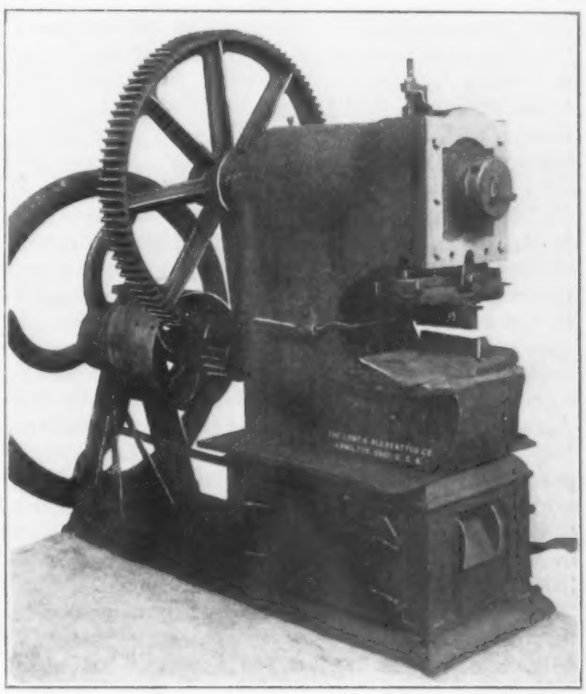
When a commodity section comes to make its full report on the allocation of any specific requirements, the chief of such section will notify a member of the Priorities Division of the War Industries Board, to be designated for such purpose by the Priorities Division, who will, with the section chief and the member, consider and tentatively determine the priority rating which such requirements will take when orders therefor will have been placed. Such tentative rating will be observed by the Priorities Committee in connection with all applications for priority on orders covering such requirements unless the Priorities Committee should (because of conditions changing in the time intervening between the time of the fixing of the tentative rating and the application for priorities, or other good cause) conclude such rating to be improper; in which event the section chief and each member of the section fixing the tentative rating will be notified and have an opportunity to be heard before such rating will be changed. In the event a change is made, the section chief or any member may appeal from such decision in the manner prescribed by that portion of the organization plan of the War Industries Board governing priorities.

It will be no part of the task of the War Industries Board to make inspection of products for which orders have been placed to keep in touch with production or follow up delays, which duties devolve upon the several Governmental departments. Each department, however, will promptly and fully advise the Requirements Division whenever serious delays in deliveries or shortages in requirements occur or are threatened.

The representatives of the Fuel Administration, the Food Administration, and the American Red Cross will attend meetings of the Requirements Division whenever they are prepared to present plans or projects under consideration, the consummation of which will require materials, supplies, facilities, electrical power, fuel or transportation affecting the industries of the United States.

Punching Machine Sixty Years Old

It will be interesting to note that a machine of comparatively light weight for its type has been in continuous operation in the shop of the Long & Allstatter



A Machine in Operation for 60 Years in Long & Allstatter Plant

Co., Hamilton, Ohio, for nearly sixty years. The accompanying illustration shows the machine, the first power punch built by John M. Long and Robert Allstatter in 1858. The pattern was made by Mr. Allstatter from a solid block of wood with ordinary carpenter tools. There was no foundry in Hamilton large enough to make the casting, which weighed about 6000 lb., and it was cast in Cincinnati, but the machine work was done in Hamilton. Much of this machine work, together with the assembling, was done by Mr. Long. The punch was originally mounted on a wooden block and was used in this way for a number of years, when a new base was substituted later on, as shown. The punch was used continuously from the time it was built until 1884, when it was repaired with a new camshaft and new gears. It was then again put in service at the Long & Allstatter plant, where it is now used on punching and shearing work that comes within its capacity.

An unusual series of sales talks for assisting salesmen has been worked up by the Moller & Schumann Co., maker of varnishes, enamels and japans, Marcy and Flushing avenues, Brooklyn, N. Y. They take the form of a page which may be inserted in a loose leaf folder and hold samples of the enamel on metal inserted in the page. For example, one shows the gloss olive drab such as is used on airplane radiators. Selling points are outlined, such as giving a chance to the purchaser to attempt to scratch the enamel or to bend and twist the enameled metal, etc.

Overcoming Troubles in Cupola Operation

Extra Fuel Beds Recommended to Prevent Poor Heats—Importance of Tap Hole Design — Free Use of New Brick an Economy

BY PAUL R. RAMP*

WITH the unusual demand for coke all over the country, the foundryman is experiencing considerable trouble in securing a uniform quality of fuel, or the kind he has been accustomed to use. This works a hardship and makes it impossible to produce melted iron as hot from day to day as in the past. Regardless of the fact that some of the remedies offered were practised by our forefathers, the following suggestions on cupola practice undoubtedly will prove their value to many foundrymen under existing conditions.

Repairing the Cupola

The first operation that should be scrutinized is picking out and repairing the cupola. The lining of the cupola can be preserved if the proper care is taken to repair it daily. The first important step is to remove all the slag clinging to the walls. This should be done before any daubing is applied.

When this slag is not removed it melts when the cupola becomes hot and leaves a space between the daubing and the walls, causing the daubing to drop into the cupola and leave the defective wall exposed to the wear, besides filling the cupola with excessive refuse that retards melting and clogs up the furnace. All slag should always be removed, even though a brick may be sacrificed in prying it loose.

Daubing should never be applied to the walls more than 1 in. thick. An excessive thickness invariably will crack and fall off when the heat strikes it, forming a bridge that cuts down the melting area. Evidence of a bridged cupola takes the form of melted iron trickling down through the tuyeres before melted iron in the hearth has reached the height of the tuyeres.

It is good practice to use as many bricks as possible in repair work from day to day. Bricks make a safer lining than mud. When a full size brick cannot be used, try a split one. A careful cupola man can build up a false lining each day that will protect the permanent wall and save a great deal of money in cupola upkeep.

A good material for daubing consists of two parts fire clay and one part heavy molding sand, mixed to a consistency of stiff mud. In this connection we would recommend Hytempite as the most effective material to use in relining a cupola. It will stand longer than the brick and will not rattle out, or become loose from the daily expansion and contraction of the cupola.

A good rule to follow is: Eliminate the slag, daub thin and use plenty of bricks.

The Sand Bottom

The sand bottom should be made of coarse molding sand mixed the same as molding sand ready for molding. This bottom should be treated just as the bottom of a mold, inasmuch as the metal is laying on it all through the heat. If it is too hard or wet the metal will boil over it, and probably cut its way down to and through the bottom plate, which results in a run-out on the cupola bottom.

The sand for the bottom should be stepped off uniformly and rammed down firmly with the butt of a molder's rammer. The lowest point of the sand bottom should be at the tap hole opening and at least 1 in. higher than the bottom of the cupola spout, to provide a fall for the metal as it leaves the tap hole. This fall is necessary to enable the operator to keep the tap hole clean.

In putting up the bottom doors care should be exercised to assure a snug fit against the bottom ring. If the doors are crooked and do not bear against the bottom ring at all points small wedges should be driven between the ring and the door at the open places.

This also prevents any movement of the doors after the sand bottom is put in. Should the doors sag it would be liable to produce a crack in the sand bottom and result in a run-out. The wedges should not be driven in until the bottom doors have been secured by the bottom post that holds them up.

Technique of the Tap Hole

The tap hole is a very important part of the cupola and is the source of much trouble if not properly taken care of.

To build the tap hole first pick out any slag that may be clinging to the sides of the breast opening, otherwise when the slag melts the molten metal may find an outlet between the breast wall and the tap hole material.

Fill the back of the breast opening with pieces of coke to prevent the material used from being rammed back into the cupola too far. Lay a 1¼-in. round rod in the breast opening with one end extending into the cupola, the other out into the spout.

Locate the rod in the position in which the tap hole is to be. Use sufficient stopping-in clay to cover the coke at the inside end of the rod to prevent the breast material from working through.

Ram the first lot of material around the rod very lightly, following with a harder ramming until the breast opening has been rammed full and flush with the outside. After the ramming has been accomplished, use a molder's sharp pointed trowel to trim around the 1¼-in. rod and form a cone-shaped hole, the apex of which should extend into the breast within 2 in. of the back end of the tap hole. Draw out the rod, black the hole with plumbago and build a fire in the spout to dry it. The breast material should consist of about two parts sharp sand and one part fire clay, depending upon their quality, and should be mixed to a consistency slightly damper than core sand ready for use.

A cone-shaped tap hole will not "freeze up" as readily as a long straight hole. One of this type should be left open when the blast is put on and until the first iron comes. It is then stopped up for a short period, after which it is opened to permit about 100 lb. of metal to

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flow through. It can be closed again while enough metal is melted to fill the ladle.

Another plan of making the tap hole is to ram the opening for the breast flush with the outside, with the rod in place, thus producing a long hole through the breast. This should be filled with dry sand just before the blast is put on. Before the hole is filled with sand, however, it must be dried out by inserting a heated rod.

The furnace is then allowed to run until a proper amount of molten iron is accumulated, after which the dry sand in the tap hole can easily be picked out. Unless a long tap hole is handled in this manner there is great danger that it will "freeze" when the first iron melted reaches the bottom and fills the hole. This necessitates digging around the cold iron plug to form another hole. The metal flowing through the new hole melts the plug in the old hole, forming a tap hole that cannot be controlled.

A third plan is to provide two tap holes, one located in the regular position, the other 2 in. above. This makes it possible to overcome any trouble from "freezing up."

Should the bottom hole freeze up the upper hole can be opened and the continued flow of metal so close to the lower hole will melt it out very shortly. After the lower hole has melted free the upper one can be stopped up again.

Very often the flow of the metal from the cupola is slower than the melt and to avoid the danger of it running into the tuyeres the usual plan has been to cut down the wind pressure. With a cupola equipped with two tap holes, however, all that is necessary is to open the second tap hole and the metal flowing from two holes very soon gets ahead of the melting.

Building the Fire

The method of building the fire in the cupola does not receive enough attention. It is a very important consideration, and has much to do with the temperature of the iron all through the heat, more especially for the first half of a long heat.

If the fire is not started properly the bed will not burn through in the right way. Cover the sand bottom with small pieces of wood, preferably pieces of boards, to protect it from the wood that is to follow. After the shavings have been placed over these boards and covered with some fine kindling wood, pieces of wood at least 4 ft. long should be placed in an upright position all around the inside of the cupola. These pieces should be at least 2 in. x 4 in. or larger, and should be spaced at not more than 2-in. intervals. The bottom ends can be placed a little toward the center to make them lean against the brick lining. Cordwood is better than pine. The well that is formed by the wood standing in this position should be filled with wood to about two-thirds of the height of the sticks.

The coke can then be charged into the cupola and the fire lighted. Always light the fire at several different points. The advantage in using the upright pieces of wood is that they burn out and leave an opening all around the coke that forms a uniform draft which results in a bed burned through at every point on the surface.

The bed should be burned through to a cherry red before charging is commenced. It may be covered with a few forks of coke just before charging, but with a black spot in the surface of the bed poor metal, the first part of the heat, is certain to result.

When the coke is very poor it is hard to burn the entire bed through to a cherry red before too much of the fuel has been consumed. In such cases the best plan is to charge one-half of the coke required for the bed and let it burn through to a cherry red, and put in the last half or enough to bring the bed up to the required height just before charging. This will not make the iron as hot as when the bed is burned through completely with reasonably good fuel, but must be resorted to in case of poor fuel.

Charging

Taking a cupola measuring 66 in. in diameter inside of lining, for example, it should be charged as follows: Fuel for bed, 2600 lb.; fuel between charges, 200 lb. of coke to 2000 lb. of iron.

The height of the tuyeres from the sand bottom may make it necessary to use more or less fuel on the bed; but unless it is desired to hold a large quantity of metal in the cupola the tuyeres should be located so as to require not more than 2600 lb. of coke for the bed.

There is some question in the minds of foundrymen as to the quantity of iron to be charged. More uniform results have been obtained by the author by using 2000 lb. of iron per charge in a 60-in. or 66-in. cupola. Better control can be secured over the temperature of the metal and a more uniform mixture reaches the ladles, more especially if the metal is taken from the cupola in ladle not holding over 1000 lb.

The practice of putting 4000 lb. or 6000 lb. of iron on the cupola bed is not good. The fact that the bed will melt 6000 lb. of iron hot does not prove that the 400 lb. of coke that would have been used between these charges, were they 2000 lb., has been saved. While the bed is melting this 6000 lb. it is being worn out and must be replenished. If it does not have to be replenished too much coke is being used between charges.

In addition to this the mixture at the spout will not be uniform because whatever metal in the mixture has the lowest melting point will be drawn off before the balance is melted, unless it is all tapped into one large ladle.

Using Poor Fuel

When the coke is below standard more of it must be used and no fixed rule can be laid down as to the quantity necessary. If one-half of the heat comes hot and the other half cold on account of fuel not being good enough to hold up all through the heat, the quantity of coke must be increased on the bad half of the heat.

If the metal is hot for the first quarter of the heat and dies down after that the first remedy is more fuel between charges. If this plan retards melting and bungs up the cupola, the next step is a new bed at the end of the first quarter. This new bed should consist of about 1000 lb. of coke, which is sufficient to raise the bed to a point where it will produce hot metal for another period, after which doubtless the iron will begin to come cold again. By several days of careful observation it can be determined at just what part of the heat these extra beds are necessary to insure a reasonably hot metal all through the heat.

For instance, a poor heat results on a certain day because of the fuel. It was found that after seven tons had been cast the metal came cold. The next day 800 lb. of coke was added to the regular fuel between the seventh and the eighth charges. The result was hot metal up to the fourteenth ton, when it came cold again. The next day 1000 lb. of coke is put in between the seventh and the eighth charges and 1000 lb. of coke between the fourteenth and fifteenth charges. This may give hot metal

until the twenty-fourth charge, which would call for an addition of coke on the twenty-fourth charge.

Such a plan should be carried out until every cold spot is made hot. In using an excessive quantity of poor fuel care must be taken to keep the slag running freely. Not only must a good flux be used, but the slag hole must be kept open at all times.

It is best to keep the cupola full of metal at all times in order to handle the slag properly. While the above plan will increase the melting ratio, there is no help for it if nothing but the poor grade of fuel is available.

Extra Coke Beds to Offset Poor Fuel

The extra beds as described are more effective than an addition of coke between every charge, and they do not tend to reduce the melting speed so much. With poor fuel to contend with, the use of Lehigh coal is very beneficial; in fact, the author believes it is the most effective remedy when it can be obtained, as it takes up less furnace room than coke, burns longer and yields more heat. The use of anthracite coal is considered old fashioned by many, but it is the one remedy that any one can use and get results from if poor fuel is the trouble.

There are several ways to use this material in the cupola. One is to put about 50 lb. in with the coke used for fusion with every charge. Egg size coal is very effective.

Another plan is to use about 1200 lb. of the Lehigh lump coal on the bed in place of an equal amount of coke. If the heat is not too long this will make up for a poor grade of fuel.

Still another plan is to use the Lehigh lump in the bed and between charges, after the heat is about half off. This scheme takes care of long heats, such as over 70 tons in a 60-in. cupola.

Importance of Uniform Charging

In putting the material into the cupola a great deal can be accomplished by uniform charging. This prevents pockets that allow the blast to get through too easy and draw away the necessary blast from other points, where it results in poor combustion. The pig iron should be placed next to the cupola walls, the lighter material, such as cast scrap and steel in the center. The coke must be carefully distributed over each charge of iron, in order to insure that the charges of metal and coke fall evenly down to the melting zone. The appearance of the cupola lining will indicate whether or not this charging has been done correctly. If the coke has been thrown in on one side of the cupola and the metal on the other, the lining on the side the excessive coke was charged will be cut out much deeper than the other.

Necessity of Watching the Cupola Man

Every morning, after a poor heat the day before, it is a good plan to examine the cupola lining before condemning the fuel, as otherwise the cupola men are liable to become careless in charging and throw the stock in any old way. The irregular cuts in the lining will be evidence enough to convict Mr. Cupola man in almost every case. Should a poor quality of coke be charged at intervals with a good grade, however, the same thing might happen, as poor fuel would burn out quicker than the better fuel and cause an open space. To avoid this all poor fuel should be charged on one charge and all good fuel on the other.

Thirteen tons should be the maximum weight of iron in the cupola at one time. A heavier load than this will crush the coke and prevent the blast from working through free enough to produce a perfect combustion, especially when poor fuel is used. A very hard coke will, of course, hold up a heavier load, but no benefit is derived from having more than 13 tons at any one time in a cupola not exceeding 66 in. inside diameter, notwithstanding the fact that many believe that considerable heat is wasted that could be utilized in heating up the fourteenth, fifteenth or sixteenth charge. Some of the best melting records, taking into account both speed and hot metal, have been made in a cupola that would not carry over nine tons, not because of the reduced diameter of the cupola, but on account of the distance from the sand bottom to the charging door. The best melting is accomplished when the blast can work through the cupola and show a flame at the charging door.

The Charging Machine a Decided Success

The charging machine is a decided success in cupola practice, although some have condemned it after what they considered a fair trial. Proper manipulation, however, will produce very gratifying results.

In operating a charging machine, it is advisable to put the first two charges in by hand work, after which the machine will do the work better and more uniformly. In using one the cupola must never be filled up to the charging door, at least 7 ft. being allowed between the top of the stock in the cupola and the bottom edge of the charging door. The machine that charges from opposite doors is the most effective, and it must be noted that the coke and the metal for any charge should be dumped through the same door, and charging should be done alternately through the two doors.

A great deal of trouble was experienced by the writer with a charging machine until this rule was observed.

Blast Pressure a Misleading Criterion

The blast pressure is a question that is discussed very often and is a matter on which many foundrymen are misled. They disregard the tuyere area and create a resistance in the blowers that registers a blast pressure that should melt good hot iron. The real remedy for blast trouble is to find out how many cubic feet of air is going into the cupola per minute regardless of the pressure indicated by the meter. This can be determined by the use of a blast volume meter. For a 66-in. cupola 8500 cu. ft. of air per min. would be about right.

More Koppers Coke Ovens

The Tennessee Coal, Iron & Railroad Co. will construct an addition to the Koppers by-product coke ovens at Fairfield, Ala., consisting of two additional batteries of 77 ovens each or a total of 154 ovens, together with complete by-product recovery plants. There are now 208 Koppers ovens at this point.

President Crawford states that the object of constructing these additional ovens at this time is primarily to secure the toluol, ammonia and benzol which are needed for the manufacture of ammunition, and also to secure a saving of several hundred thousand tons of coal per annum, which will result by substituting coke manufactured by the by-product oven process for coke which is now being manufactured in bee-hive ovens.

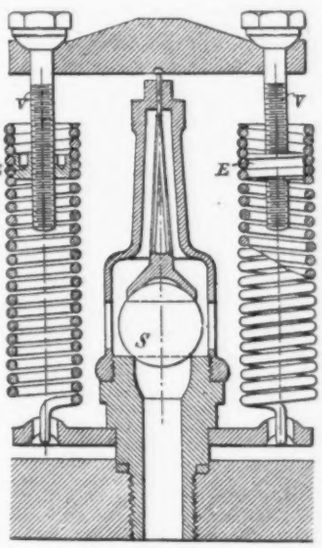
The Birmingham Trussville Iron Co. expects to have its furnace at Trussville, Ala., ready for blast before the end of April. There have been delays due to difficulty in getting machinery delivered for the company's new coal mines.

SPEEDING UP BRINELL TESTS

Correct Results at a Rapid Rate Obtained by a French Device

IN munition works the Brinell hardness test has been found very valuable and its use is now a necessity in many cases. It is extensively used on various parts in the manufacture of the Browning guns.

In laboratory practice considerable time has been found necessary to make a satisfactory test, even up to 5 minutes, according to a writer in London *Engineering*. In French munition works 10 seconds are said to be allowed, but it is admitted that the measurements may then be incorrect by 8 per cent. The quicker the rate of putting on the load, the smaller will the observed impression be, since a hard material will continue to yield gradually. With varying rates of putting on the load, the Brinell numbers will hence fluctuate.



Changes in the Brinell Hardness Testing Machine to Accelerate Its Efficiency

The following figures as to the influence of the rate of applying the load were given by Mr. Guillery in a communication recently presented to the Académie des Sciences (*Comptes Rendus*, Oct. 8, 1917). The columns indicate: A, rate of applying load, in kilogrammes per second; D, diameter of impression in millimetres; B. H., Brinell hardness number; T. S. tensile strength in kilogrammes per square millimetre; the intermediate columns indicate the errors, and the last column gives the percentage error; I refers to a soft steel, II to a semi-hard steel:

	A.	D.		B. H.		T. S.		Per Cent
I.	0	4.74	0	159	0	55.6	0	0
	12.5	4.72	0.02	161	2	56.3	0.7	1.2
	25	4.70	0.04	163	4	57.0	1.4	2.4
	1500	4.60	0.14	171	8	59.8	4.2	7.1
II.	0	4.094	0	212.5	0	74.3	0	0
	12.5	4.074	0.020	217	4.5	76.0	1.7	2.2
	25	4.059	0.35	221.5	9	77.7	3.3	4.3
	1500	3.975	0.118	227	14.5	79.4	5.4	7

Mr. Guillery obviates these errors by means of a simple mechanical contrivance which is based upon the following considerations. If the pressure were released immediately after reaching the maximum value of 3000 kg., the diameter measured would be too small by the differential quantity dD; if, on the other hand, the load were increased to (3000 + dP), the diameter would be too great. For the increment d P the error resulting from the insufficient duration of the pressure-effect can be compensated for in accordance with the relation: d P/3,000 = 2d D/D. In the case when the load was applied at the rate of 1500 kg. per second (fourth row of I), d D was 0.14, and hence: d P = 3,000 × 2 × 0.14/4.74 = 177 kg.

To effect this compensation, that is to say, to regulate the maximum pressure automatically in accordance with the rate of charge, so as to be able to obtain correct results at a rapid rate, Mr. Guillery devised the apparatus illustrated in the illustration. The pressure is applied by the aid of a hydraulic piston, the action of which is limited by the ball valve *S*. The lift of *S* is opposed by the spiral springs, which can be adjusted in two ways, firstly by the aid of the screws *V*, and secondly by the aid of the nuts *E*, which on their outer circumferences are threaded to fit the convolutions of the spiral spring. The tension is altered by adjusting the screw *V*, and the position of *E*, which he turned up and down, adjusts the height of the spiral spring which is being utilized. By trial now the operator determines the impressions which, in the case of a certain steel, are normal for two rates of putting on the load, the rates varying in the ratio of 1 to 30; the device will then be adjusted also for any rate of applying the load intermediate between the limits adopted. Thus it will not matter whether the load is put on a little more or less rapidly than in the usual practice. The following figures show the accuracy which has been realized with the aid of this device; the upper row indicates the rate of applying the load, in kilogrammes per second, the lower row the corresponding diameter of the impression produced, in millimetres:

100	200	300	600	1000	1500	3000 kg.
4.38	4.37	4.40	4.39	4.40	4.39	4.39 mm.

The agreement looks satisfactory. Strictly speaking, a new adjustment should be made for every style of metal. It has been found, however, that the same adjustment will suffice for carbon steels and special steels which have undergone some thermal treatment. He gives the following diameter values in support of this statement; the first line indicates the rate of application of the load in kilogrammes per second, the last column referring to the standard Brinell test:

	12.5	100	600	3000	Standard
Soft steel	5.67	5.66	5.67	5.68	5.66
Semi-hard steel	4.40	4.36	4.36	4.36	4.36
Nickel-chrome steel	3.63	3.60	3.59	3.62	3.38
Same, reheated	2.61	2.62	2.62	2.63	2.60

Mr. Guillery states that the device has been working for several months without having failed on any occasion. With specimens of similar form, easy to handle, 600 tests can be performed per hour, 8 seconds of the 10 seconds of a test being required for the manipulations and 2 seconds for putting on the pressure. After a time, we should think, the spiral springs will need correction and renewal, and the question may be asked, whether the spring device, unless in itself a convenience, really offers sufficient advantage, considering that the engineer frequently has to reckon with experimental errors of a few per cent.

New High Speed Alloy Containing Zirconium

A new alloy, with high speed cutting properties, has been invented by George L. Kelley of Germantown, Pa., and Albert H. Miller of Ambler, Pa., and assigned to the Midvale Steel Co., Philadelphia. The patent is U. S. No. 1,258,227—March 5, 1918. A feature is the use of zirconium, associated with a preponderance of nickel or cobalt, varying in proportions from 2 to 40 per cent. The patentees claim, however, that they have found that a superior product may be obtained if the quantity of zirconium is reduced below what has hitherto been considered the minimum of efficiency, provided that there is associated with the zirconium aluminum and silicon in certain minimum proportions substantially exceeding the proportion of zirconium. The preferred composition is as follows:

	Per Cent		Per Cent
Carbon	0.1	Silicon	6.0
Nickel	86.4	Zirconium	1.5
Aluminum	6.0		

The zirconium may vary from 0.5 to 2 per cent. A larger amount is not prohibitive but where silicon and aluminum are present in the proper proportions an excess of zirconium is without benefit and may be harmful. Other details are given in the letters patent.

Unemployment in Denmark is increasing very rapidly, according to a recent issue of *Engineering* of London. At the end of the first week of January some 41,000 organized workmen were out of jobs.

The Sandstrom Shipbuilding Co., Seattle, has been placed in the hands of receivers. The company has liabilities of $1,000,000. It has contracts for six wooden ships.

Erichsen Tests on Aluminum Sheets

How This Method Is Applied as a Means of Determining the Ductility and of Regulating the Annealing of 18-Gage Material

BY ROBERT J. ANDERSON

IN the present article are presented the results of tests made with the Erichsen ductility testing apparatus on annealed 18-gage aluminum sheets. The Erichsen apparatus stands forth as an accepted machine for determining the ductility of thin metal, such as sheets. One of the distinctive

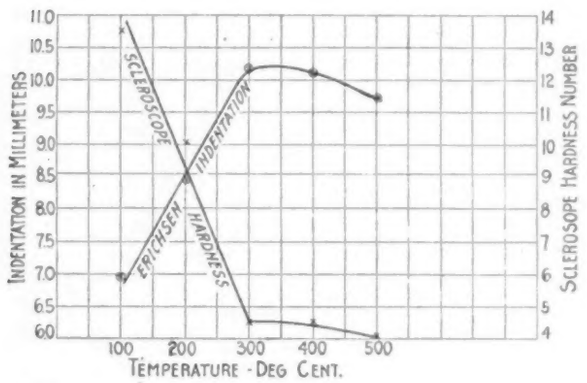


Fig. 1—Temperature-Indentation and Temperature-Scleroscope-Hardness Curves for Annealings on 18-Gage Aluminum Sheets. Time constant at 120 minutes

features of this test is the evidence of approximate grain size of the metal tested, which the fractured domes of the test pieces indicate. Particularly is this test of value as a guide to drawing operations on annealed metal. Under-annealed metal will rupture by deep draws owing to its hardness and lack of ductility, while over-annealed metal will also rupture because of the weakened condition of the metal resulting from large grain size. The domes of the Erichsen test pieces indicate at once how a given metal may be expected to behave in the draw press because, in fact, the apparatus is itself a miniature draw press.

The Erichsen apparatus, which was illustrated in THE IRON AGE, July 23, 1914, and was further discussed in THE IRON AGE, Feb. 8, 1917, consists essentially of a die and holder for holding the sample to be tested and an internal tool actuated by a hand wheel which moves gradually forward until the sample is ruptured. The progress of the internal tool and the ultimate fracture are observed in a mirror, and the depth of indentation is read directly from a micrometer graduated screw.

With ductility control of metal going into draw-press work, the percentage of scrap may be largely reduced, and the annealing operations put upon a rational basis which will provide the desired ductility in the metal. Success in drawing metal depends considerably upon the ability of the draw-room foreman in accomplishing the desired object with as few draws as possible. Thus if a given deep draw might be accomplished with two operations instead of four, the production cost would be reduced. This is extremely important to small fabricators who purchase semi-finished metal in the market and are obliged to sell their finished product against a certain list. In fact, efficiency in the draw room may determine whether the plant can continue to operate or not. With these preliminary remarks, the writer will present certain data on the Erichsen testing of annealed 18-gage aluminum sheet.

Preliminary Erichsen tests were made on a certain lot of 18-gage aluminum sheets which had worked badly in the draw press; in fact about 25 per cent of the metal had been scrapped because of rupture in the press. This metal was originally cold-rolled sheets, which had been reduced in the cold from a 0.25 in. slab to 18 gage; it had then been annealed at 370 deg. C. for 24 hr. The results of the preliminary Erichsen tests are given in Table 1. The indentation values are fairly uniform, but are too high for 18-gage aluminum sheets of good drawing quality. The fractured domes were exceedingly coarse, indicating that the metal was totally unfit for drawing.

A number of annealing tests were then made upon 18-gage cold-rolled aluminum sheets which was reduced in the cold from a 0.25 in. slab to 18 gage. The metal employed was American metal of high purity, containing over 99 per cent aluminum with impurities normal. The annealings were made in a laboratory electric furnace of the resistance type under pyrometric control, and the temperatures given are accurate within 10 deg. C. Schleroscope hardness readings were made with the Shore instrument. From the practical standpoint, aluminum sheets is regarded as soft when the Shore value approximates 4 to 5. The results of the annealing experiments are given in Tables 2 to 5 inclusive.

The data in Table 2 show that the metal under discussion attained maximum softness by annealing at 300 deg. C. for two hours. Sample No. 4 indicated good drawing quality from the appearance of the smooth dome, but the domes in Nos. 5 and 6 were increasingly coarser in appearance, indicat-

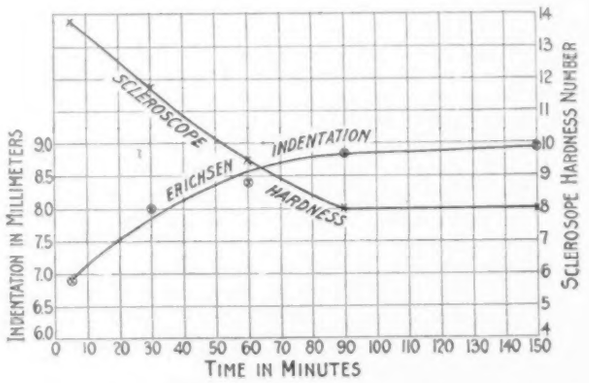


Fig. 2—Time-Indentation and Time-Scleroscope-Hardness Curves for Annealings on 18-Gage Aluminum Sheets. Temperature constant at 200 degrees C.

ing too high an annealing temperature for the time employed. These latter samples were blistered, whereas No. 4 was not. The effects of annealing at the constant temperature 200 deg. C. for various times is given in Table 3. The data in this table show that 200 deg. C. is too low a temperature to

employ for annealing 18-gage cold-worked sheet; the metal was not softened to 5 scleroscope number in 2.5 hr., so that this temperature cannot be considered for rapid annealing. The work hardness of cold-rolled aluminum sheets is but slowly reduced by annealing at 200 deg. C.

Further effects of annealing at a constant temperature, in this instance 300 deg. C., are recorded in Table 4. These results show that complete softening, below 5 Shore number, was obtained by annealing for one hour and 20 min. at 300 deg. C.; the fractured domes were smooth, and metal so annealed appeared to be well suited to drawing. In Table 5 are given the results of annealing the metal at 400 deg. C. for various times. The data in Table 5 show that complete annealing may be effected by an exposure of 5 min. at 400 deg. C. In short, these annealing experiments show definitely that hard-worked 18-gage aluminum sheets may be softened and put in good condition for drawing by relatively short annealing periods at moderate temperatures. Obviously, long time exposures are unnecessary, and such practice not only wastes fuel but also is the direct cause of much scrap production in the draw room.

Table 1—Preliminary Tests on Annealed 18-Gage Aluminum Sheets

Sample	Thickness in Millimeters	Indentation in Millimeters	Appearance of Domes
1	1.03	10.62	Coarse
2	1.05	10.78	Coarse
3	1.03	10.82	Coarse
4	1.00	10.50	Coarse
5	1.04	10.61	Coarse
6	1.05	10.79	Coarse

Note: All samples had been annealed for 24 hr. at 370 deg. C.

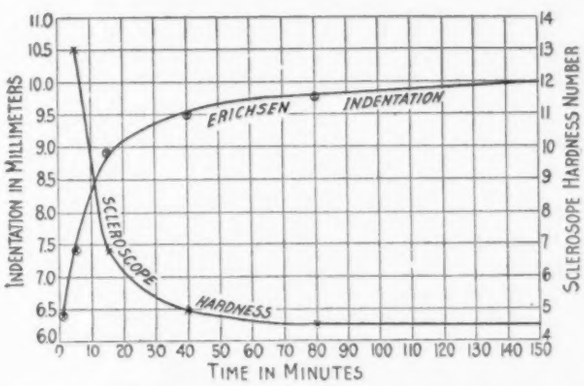


Fig. 3—Time-Indentation and Time-Scleroscope-Hardness Curves for Annealings on 18-Gage Aluminum Sheets. Temperature constant at 300 degrees C.

Table 2—Effect of Annealing 18-Gage Aluminum Sheets; Temperature Variable, and Time Constant at Two Hours

Sample	Temperature in Deg. C.	Thickness in Millimeters	Indentation in Millimeters	Scleroscope Hardness	Appearance of Domes
1	As rolled	1.08	6.83	14.0	.....
2	100	1.08	6.96	13.5	.....
3	200	1.09	8.39	10.0	.....
4	300	1.07	10.17	4.5	Smooth
5	400	1.07	10.10	4.5	Medium
6	500	1.09	9.73	4.0	Coarse

Note: (a) Time constant at 120 min.; (b) Values given represent the mean of two closely agreeing determinations.

Table 3—Effect of Annealing 18-Gage Aluminum Sheets; Time Variable and Temperature Constant at 200 Deg. C.

Sample	Annealed, Minutes	Thickness in Millimeters	Indentation in Millimeters	Scleroscope Hardness	Appearance of Domes
7	5	1.07	6.89	13.8	.....
8	30	1.07	7.97	11.8	.....
9	60	1.08	8.40	9.5	.....
10	90	1.09	8.84	8.0	.....
11	150	1.09	8.87	8.0	.....

Note: (a) Temperature constant at 200 deg. C. (b) Values given represent the mean of two closely agreeing determinations.

In Figs. 1 to 4 inclusive are given curve plots made from the data in Tables 2 to 5. While self explanatory, a brief consideration of these curves may be of interest. It will be noted that in annealing aluminum sheets that the greater part of the softening occurs quite quickly and that thereafter the drop in the Shore value is very slow until it ceases, or practically so. In Fig. 3, the temperature-indentation curve rises steadily to a maximum of 10.17 mm. at 300 deg. C. (the time being constant at two hours), and then falls off from the maximum with increasing temperature but less rapidly than it approached it. The scleroscope hardness falls off rapidly with increasing temperatures to 4.5 at 300 deg. C. and to 4 at 500 deg. C. In Fig. 4, the time-indentation curve rises steadily with longer exposures and the scleroscope hardness falls concomitantly. In Fig. 5, the time-indentation curve rises rapidly with exposures of from one minute to 15 min., and then less rapidly with exposures to 80 min., and thereafter very slowly. In Fig. 6, the time-indentation curve rises abruptly and then gradually to a maximum at 30 min., and then falls. The time-scleroscope-hardness drops abruptly, and then gradually, and then slowly if at all. Fig. 6 shows how most of the annealing is accomplished in fast times.

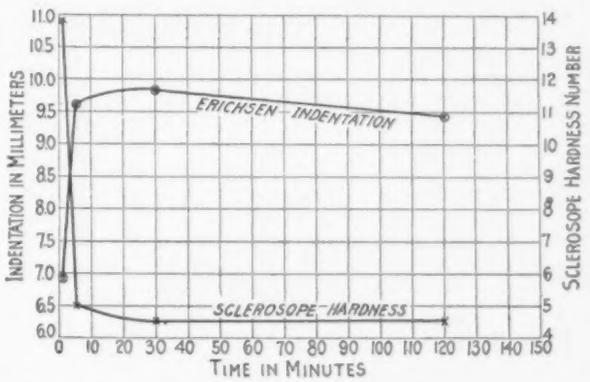


Fig. 4—Time-Indentation and Time-Scleroscope-Hardness Curves for Annealings on 18-Gage Aluminum Sheets. Temperature constant at 400 degrees C.

Table 4—Effect of Annealing 18-Gage Aluminum Sheets; Time Variable and Temperature Constant at 300 Deg. C.

Sample	Annealed, Minutes	Thickness in Millimeters	Indentation in Millimeters	Scleroscope Hardness	Appearance of Domes
12	1	1.07	6.38	14.30	.....
13	5	1.08	7.38	13.0	.....
14	15	1.08	8.89	6.8	.....
15	40	1.09	9.47	5.0	Smooth
16	80	1.08	9.76	4.5	Smooth
17	180	1.09	10.15	4.5	Medium

Note: (a) Temperature constant at 300 deg. C. (b) Values given represent the mean of two closely agreeing determinations.

Table 5—Effect of Annealing 18-Gage Aluminum Sheets; Time Variable and Temperature Constant at 400 Deg. C.

Sample	Annealed, Minutes	Thickness in Millimeters	Indentation in Millimeters	Scleroscope Hardness	Appearance of Domes
18	1	1.09	6.83	13.8	.....
19	5	1.08	9.62	5.0	Smooth
20	30	1.09	9.83	4.5	Coarse
21	120	1.08	9.42	4.5	Coarse

Note: (a) Temperature constant at 400 deg. C. (b) Values given represent the mean of two closely agreeing determinations.

In order to expedite its Government work the Westinghouse Electric & Mfg. Co. is moving its automobile equipment manufacturing works from East Pittsburgh, Pa., to its factory at Newark, N. J., which has been for years specializing in the manufacture of small motors and precision instruments and is adapted for the new work. The sales office will be removed to the McCreery Realty Building, 110 West Forty-second Street, New York. From now on the entire capacity of its Shadyside works will be devoted to Government contracts.

ORE RATE DECISION

Important Principle Announced by Interstate Commerce Commission

WASHINGTON, April 9.—In a final report on the long-pending case of the Thropp Furnaces against the Bessemer & Lake Erie Railroad Co., et al, in which combination through rates on iron ore in carloads from Conneaut Harbor, Ohio, via Butler to Earlston and Saxton, Pa., are found unreasonable and are ordered to be reduced, the Interstate Commerce Commission lays down the important principle that its jurisdiction under the act to regulate commerce, as amended, to order the establishment of through interstate routes, and to fix joint rates applicable thereto, is not defeated by the fact that such routes are composed in part of portions of the lines of carriers wholly within one State, where the carriers whose lines constitute through routes engage in interstate commerce and maintain local rates applicable in combination to the interstate movement of the traffic and between the points of origin and destination at issue. The decision, therefore, brings certain intrastate roads under the jurisdiction of the commission for rate-making purposes under certain circumstances.

The complainant in this case owns and operates at Earlston and Saxton, in southwestern Pennsylvania, two merchant blast furnaces, in which he manufactures foundry pig iron from iron ore transported ex-lake mainly from Buffalo, and partly from Erie, Pa. Earlston, which is also known as Mount Dallas, is the southern junction point of the Pennsylvania Railroad Co. and the Huntingdon & Broad Top Mountain Railroad & Coal Co. Saxton is situated on the line of the Broad Top road 19 miles northeast of Earlston. The movement of iron ore from Buffalo and Erie to Earlston is purely local to the Pennsylvania road, while that to Saxton is by way of the Pennsylvania line to Huntingdon, Pa., 26 miles northeast of Saxton, the northern junction of that road with the Broad Top road, and thence via the latter road to destination. The complainant alleges that the rates charged by the railroad companies for the transportation of iron ore from Lake ports to Earlston and Saxton are unreasonable and amount to a discrimination.

Upon considering the whole record on its merits the commission finds that the present rate of $1.54 for the line haul, plus the transfer charge of 6 cents, aggregate rate $1.60, for the transportation of iron ore, carloads, from Buffalo and Erie to Earlston and Saxton, has not been shown, under the present emergency conditions, which are considered in *The Fifteen Per Cent Case* to be unreasonable or unjustly discriminatory. But it further finds that the combination through rates on iron ore, carloads, from Conneaut Harbor to Earlston and Saxton are unreasonable and unjustly discriminatory, and expresses the opinion that the Bessemer & Lake Erie Railroad and Pennsylvania Railroad Co. should be required to maintain and apply, over a through route from Conneaut Harbor, via Butler, to Earlston, and the Huntingdon & Broad Top Mountain Railroad & Coal Co. should be required to maintain and apply, over a through route from Conneaut Harbor, via Butler, to Saxton, joint rates not exceeding, for the line haul, $1.375, applicable only from the tracks of the line-haul carrier at Conneaut Harbor, which would be a reasonable and nondiscriminatory maximum rate via those routes. This line-haul charge, added to the transfer charge of 6c. per long ton in effect at Conneaut Harbor, would amount to $1.435 per gross ton. However, following the permission granted to the carriers in *Iron Ore Rate Cases*, the railroads are permitted to establish this rate via other routes than those specified or from other lower Lake Erie ports than Conneaut Harbor to Earlston and Saxton.

The A. A. Lane Construction Co., Cleveland, has taken a contract for a coal crushing plant for the Carnahan Sheet & Tin Plate Co., Canton, Ohio.

COST-PLUS CONTRACTS

Investigation by Congress Proposed by Representative Campbell

WASHINGTON, April 9.—A drastic resolution providing for a searching investigation of alleged frauds growing out of so-called "cost-plus" contracts has been introduced in the House by Representative Campbell, of Kansas. Under the terms of the resolution the inquiry is to be conducted by a joint committee of three Representatives and two Senators, and pending the outcome the Treasurer of the United States is directed to withhold further payment on any cost-plus contracts entered into by the Government for any purpose.

The joint committee is required to make such investigation as shall be necessary to disclose "all the facts in relation to such contracts as have been made, upon the cost-plus basis, and that such committee be directed to inquire into the extent, if any, that laborers have been directed to slow up work so as to perform less than a usual day's work during an 8-hr. period; the extent to which materials have been paid for at a higher cost than the market price; the extent to which such materials have been wasted; and to inquire into all and every phase of the purchase of materials and the performance of labor upon such contracts that would in any way tend to increase the cost to the Government of the contract price of the material or the construction called for in such contracts as the Government has entered into on the cost-plus basis." The resolution has been referred to the Committee on Rules before which Representative Campbell will seek a hearing at an early date for the purpose of urging a favorable report. Inasmuch as it provides for the appointment of a joint committee of the two houses the resolution must also be acted on by the Senate and it must therefore run the gauntlet of the Senate Committee on Rules.

There can be no doubt that a great deal of information has been obtained by Senators and Representatives, partly through official sources, but also from private parties more or less interested, indicating that there is a large waste of public money under cost-plus contracts. Hog Island is only a salient instance of the free expenditure of money which doubtless would have been spent with greater care but for the fact that the contractors had no incentive to keep down the cost. So much scandal has been caused by cost-plus contracts that this form of agreement has been specifically forbidden in the housing bill for the benefit of munition plants which passed the House last week. Further legislation along the same line may be looked for in connection with other projects involving contracts for large amounts.

In spite of the tendency to prohibit cost-plus contracts, however, the Council of National Defense, as heretofore stated in this correspondence, is prepared to defend this type of agreement and has formulated a standard contract founded on this principle. Many officials believe that these contracts can be so safeguarded as to fully protect the interests of the Government, and it is quite generally admitted that the plan of compensating contractors proportionately to the size of the job, or the expenditures involved, is a logical one. In view of the diametrically opposite views now being voiced by Congress and the Council of National Defense concerning the cost-plus contract, the disposition to be made of Representative Campbell's resolution will be awaited with much interest.

The Western Machinery & Equipment Co., Spokane, Wash., has been appointed exclusive northwest agent for the International High Speed Steel Company, with territory of Washington, Idaho, Montana and Oregon. Branches will be established in Butte, Seattle, and Portland.

Ralph L. Skinner and W. G. Hansen have dissolved the firm of Skinner & Hansen, Sacramento, Cal., and the business will be continued by Mr. Hansen under the name of the W. G. Hansen Machine Works.

Liberty Loan Subscriptions Come Rapidly

Country Thoroughly Aroused and Iron and Steel Men Taking Leading Parts—Interesting Features in New York, Cleveland, Chicago and Other Cities

REPORTS from all parts of the country indicate great enthusiasm for the third Liberty loan. It is clear that preliminary work has been more thoroughly done than in the two preceding campaigns, and several hundred towns have already reported that they have more than subscribed for their quota. Men in the iron, steel and machinery lines are among the leaders in many parts of the country, and it is confidently believed that the great plants for manufacturing iron and steel, and also the smaller ones, will give a good account of themselves.

The city of New York, whose quota is $900,000,000, will not be satisfied with less than $1,500,000,000. It is deeply stirred, and subscriptions have been piling up rapidly, being over $100,000,000 up to Monday evening. Some of the events of Monday in New York were as follows, and give an idea of the great variety of activities connected with this patriotic movement:

9 a. m.—Liberty coach leaves Batavia, N. Y.; Batavia starts Liberty ball rolling toward New York.

10 a. m.—Liberty loan booths throughout city opened.

12 m.—Liberty loan appeals made on Sub-Treasury steps by Charley Chaplin and Douglas Fairbanks.

12.30 p. m.—Liberty Theater opened on Public Library steps.

3.30 p. m.—Liberty loan address by James M. Beck at the Stock Exchange.

5.30 p. m.—Liberty loan exercises by Girl Scouts at Plaza Circle.

8 p. m.—Military parades.

Judge Gary's Statement

Elbert H. Gary, chairman of the board of directors of the United States Steel Corporation, said Saturday that subscriptions to the third Liberty Loan offer the best opportunity for combining patriotism with profitable investment. He said:

"The news which we are now receiving from Europe, showing the desperate struggle the Allies are making to stem the tide of Hun invasion, must be regarded as very timely, although very distressing. Can there be any Americans who still need to be convinced that we are facing an emergency which threatens the very life of the nation and of civilization?

"The conviction has forced itself home to all of us by this time that a situation of most real danger has to be overcome if the safety of America represents anything more to us than a mere empty shell.

"Considered solely from the individual point of view, the buyer of Liberty bonds is in an enviable position as compared with the man in the trenches. Though making a possible sacrifice, which everybody hails with enthusiasm, he is really adding to his personal wealth and is really bettering his condition by his support of the Government. For the soldier there is no such alternative. It is a privilege that goes along with the Liberty bonds, and it must be considered in the present emergency in connection with the sacrifice of career and life risked by the actual fighter."

Metal Working Lines in New York

The Hardware, Metals and Allied Trades Division has again undertaken as one of the 101 trade divisions of the Rainbow Division, in Greater New York, to do its best toward collecting a large part of New York's quota of $900,000,000 of the third issue of Liberty bonds, as representative of the United States Treasury Department, by appointment of Benjamin Strong, Jr., Governor of the Federal Reserve Bank, second district. George H. Richards, an active member of the committee during the campaign last spring for 10,000 additional recruits for the National Guard, and very active during the drive for the Liberty Loan in October last, was induced to accept the position of chairman.

This committee, as soon as the October campaign ended, began preparation for the expected third loan, spending several months and a considerable sum of money in preparing a full list of 7000 names in Greater New York, zoning them for convenient calls and otherwise carefully preparing in all ways possible for the canvass when ordered. It was not definitely decided what the committee's scope was to be until April 4, since which time the work has been rushed with the hope of collecting about 50 per cent more than the October total of $42,218,250, which made the Hardware, Metals and Allied Trades first of 98 trade divisions. To get this will necessitate the most intense and painstaking labor constantly until the end. The committee follows:

George H. Richards, Remington Typewriter Co., chairman.
R. H. Ismon, American Can Co., vice-chairman.
William H. Taylor, THE IRON AGE.
H. S. Demarest, Greene, Tweed & Co.
George F. Taylor, Corbin Cabinet Lock Co.
John Sargent, Sargent & Co.
T. H. Taylor, American Steel & Wire Co.
W. V. Hawkins, Columbian Rope Co.
Frederick Smith, Froment & Co.
R. J. Atkinson, Rep. Metropolitan Hardware Assn.
Edward H. Darville, *The Hardware Age*.
Ralph F. Chatillon, John Chatillon & Sons.
R. B. Budd, U. S. Steel Products Co.
W. A. Tucker, H. A. Rogers Co.
R. G. Thompson, Lufkin Rule Co.
D. T. Mallett, *Hardware Dealers' Magazine*.
A. C. Penn, A. C. Penn, Inc.
E. T. Kiggins, E. T. Kiggins.
George Carey, 280 Broadway, secretary, phone, 2615 Worth.
H. B. Spalding, A. G. Spalding & Bros.
A. Blackburn, H. & D. Folsom Arms Co.
S. B. Morris, Mosler Safe Co.

Machinery Trade Loan Committee

The Liberty Loan committee for the machinery and machine-tool trades of New York is headed by James W. Lane, president E. W. Bliss Co., Brooklyn. R. L. Patterson, president American Machine & Foundry Co., is vice-chairman; Charles B. Houston, E. W. Bliss Co., secretary; Norman Dodge, vice-president Mergenthaler Linotype Co., director of speakers, and Charles A. Hirschberg, Ingersoll-Rand Co., publicity director. The following are members of the committee:

M. H. Avram, Slocum, Avram & Slocum; L. Barron, De La Vergne Machine Co.; Leigh Best, American Locomotive Co.; R. K. Blanchard, Neptune Meter Co.; G. D. Branston, Manning, Maxwell & Moore; Arthur W. Buttenheim, McKiernan-Terry Drill Co.; W. L. Callister, W. L. & J. T. Callister; De Courcey Cleveland, Central Foundry Co.; C. Philip Coleman, Worthington Pump & Mach. Corporation; C. I. Cornell, Pratt & Whitney Corporation; F. W. H. Crane, R. Hoe & Co.; J. J. Cuehler, Columbia Machine Works & Malleable Iron Co.; C. G. Curtis, Curtis Turbine Co.

Augustine Davis, Davis-Bournonville Co.; F. S. De Lano, American Car & Foundry Co.; H. H. Doehler, Doehler Die Casting Co.; George Doubleday, Ingersoll-Rand Co.; F. F. Fitzpatrick, Railway Steel Spring Co.; Henry Fuller, Fairbanks-Morse Co.; P. H. Gill, P. H. Gill & Sons; R. E. Gilmore, Sperry Gyroscope Co.; D. H. Haynes, American Machine & Foundry Co.; J. H. Hayward, Hayward Co.; W. T. Hunter, A. Schrader's Son, Inc.; Isaac B. Johnson, Isaac G. Johnson & Co.; J. C. Kelly, National Meter Co.; W. P. Kethart, H. D. Berner & Winterbauer Co.; H. C. Knox, American Brake Shoe & Foundry Co.; John Lidgerwood, Lidgerwood Mfg. Co.; T. Frank Manville, H. W. Johns-Manville Co.; T. J. Menten, Schaeffer & Budenberg Mfg. Co.; Edw. T. Morse, Morse Dry Dock & Repair Co.; C. E. Murray, Metropolitan Engineering Co.; Henry Prentiss, Prentiss Tool & Supply Co.; Joseph T. Ryerson, De Mant Tool & Machine Co.; E. A. Stillman, Watson-Stillman Co.; H. R. Swartz, Intertype Corporation; Charles Taylor, Clark, Dodge & Co.; Herbert G. Thomson, Anchor Post Iron Works; J. M. Turner, General

Acoustic Co.; J. H. Walbridge, Lalance & Grosjean Mfg. Co.; J. Harvey Williams, J. H. Williams & Co.; J. B. Wing, Dexter Folder Co.

Chicago Gets Under Way with Enthusiasm

CHICAGO, April 6.—With a great burst of enthusiasm, Chicago's third Liberty loan campaign started to-day with a big parade and a multiplicity of devices to drive home the necessity of buying bonds. The organization of trade committees, which with sub-committees are to manage the sale of third Liberty loan bonds, is complete and ready.

S. J. Llewellyn, president Interstate Iron & Steel Co., chairman of the division embracing iron and steel, brass and kindred lines, is confident that the iron and steel industry of this section will do its full part in bringing Chicago's quota up to or over par. The official application blanks have been delivered, and a small army of active young men employed in the iron and steel trade are at work. Some of them did not wait for the official blanks.

E. P. Welles, president Charles Besley & Co., is vice-chairman of the machinery and supply section, to which also have been assigned the Deering Works of the International Harvester Co., the Western Electric Co. and the Kellogg Switchboard & Supply Co. Mr. Welles and his workers will thoroughly canvass the local machine tool and supply trade. They are making their headquarters at the Machinery Club of Chicago, where a luncheon at which the arrangements were discussed was held April 4. As in the case of the iron and steel trade, only firms rated at over $35,000 will be approached by the solicitors of the machinery group. At the luncheon, it was decided to ask branch house managers to request their home offices to make an allotment for the Chicago district, it being pointed out that many subscriptions actually placed from Chicago are credited to other cities, notably New York.

Practically every large company has perfected individual plans for helping employees acquire bonds. Joseph T. Ryerson & Son's employees did well on the first bond issue, did better on the second and it is confidently believed that the third will eclipse both. The company's new campaign will be in behalf of both the bonds and thrift stamps, preference being given to the loan. Many employees will obligate themselves to monthly payments of bonds and small weekly payments toward thrift stamps, and those who cannot subscribe for another bond or two will at least buy stamps. The company offers a liberal arrangement for payment of bonds, and stirs enthusiasm by means of circulars, bulletins, shop meetings and conferences of department heads. Payments are deducted from wages or salaries, and the plan applies to all four warehouses of the company.

The Iroquois Iron Co. has taken a liberal stand in underwriting bonds for its employees. Like other companies, it permits them to pay for their subscriptions in 10 instalments, and has agreed, should an employee's circumstances compel him to relinquish a bond, to take it off his hands and return to him whatever he may have paid. The employees are thus reassured that they can readily obtain the money they have invested, should urgent need arise.

Cleveland Opening Auspicious

CLEVELAND, April 8.—With enthusiasm that exceeded that displayed in either of the other two campaigns, and with the entire city gayly decorated with flowers, the third Cleveland Liberty loan drive was inaugurated Saturday with the booming of guns and the ringing of bells. The day was to a certain extent made a holiday, and many manufacturing plants not engaged in essential Government work that ordinarily operate the entire day on Saturday closed at noon.

Cleveland's quota in the campaign is $55,000,000, and it is the aim of the Industrial Committee having charge of subscriptions in plants to secure 100,000 subscriptions in the Cleveland mills and factories. Everything was ready on the opening day for the start of the campaign. All plants had been supplied with posters and other printed matter in various languages, and with the necessary blanks. Practically all plants had made complete arrangements for soliciting subscriptions either by special committees or through its regular organization, and the solicitors started their work Saturday, and will conduct it intensively until completed. Every manufacturing plant will look after the soliciting of subscriptions among its own employees, and all are striving to break the excellent records established during the first and second campaigns. The program on the opening day included a flag raising and meeting on the Public Square in the morning, during which an address was delivered by Mayor Harry R. Davis, the dedication of a tank on the Public Square at noon, and parade of uniformed societies during the afternoon, which was followed by a mass meeting at Central Armory, which was addressed by Secretary of the Navy Daniels and others.

Milwaukee's Record

MILWAUKEE, WIS., April 8.—An even more thorough and efficient soliciting organization than that which canvassed the metal-working industry for the purposes of the first and second Liberty loans has been worked out by Richard P. Tell, who again has been appointed chairman of the metal trades section of the Milwaukee regional committee for the third Liberty loan campaign. Mr. Tell, who is president and general manager of the National Brake & Electric Co. and National Steel Foundries, Milwaukee, is president of the Milwaukee Metal Trades and Founders' Association, and will conduct the campaign through the medium of the association. Although solicitation work started on April 6, the real campaign will not begin until April 13, when citizens of Milwaukee will make a huge demonstration by means of a third Liberty loan parade, in which the metal trades section will again participate.

Milwaukee's quota for the second loan was $25,000,000 and the metal trades section adopted $5,000,000 as its allotment. The actual subscription amounted to $7,600,000. For the purposes of the third loan, the city's quota is $15,000,000 and the metal trades section has set out to reach a subscription of not less than $3,000,000. It is expected, however, that the total amount will reach $4,500,000.

To refute allegations made in other parts of the country that Milwaukee is not loyal, the Milwaukee Association of Commerce has issued the following figures to show the large over-subscriptions made here in past campaigns:

	Allotment	Subscription
First Liberty loan	$14,000,000	$17,000,000
Second Liberty loan	25,000,000	33,000,000
Red Cross war fund	500,000	780,000
Y. M. C. A. and Y. W. C. A. war fund	165,000	187,000
Red Cross membership campaign	100,000	162,000
Knights of Columbus war work fund	100,000	131,000
Totals	$39,865,000	$51,260,000

Liberty Loan Campaign of a New Haven Company

The Winchester Repeating Arms Co., New Haven, Conn., describes its method of conducting a Liberty Loan campaign as follows:

"The Liberty Loan salesmen committee of New Haven, Conn., meets for preliminary purposes with representatives of this company in order to discuss the method of procedure throughout the plant. At that time groups of the best salesmen in the community are chosen and they are divided into five groups with six men to a group. The leader is an exceptional speaker. These men are instructed in the methods and the detail of the plan adopted by the company. The work of receiving these salesmen, scheduling throughout the plant, and in fact all work except the actual accounting, is done by the personnel department.

"We resort to clock notices, all the available posters we can obtain, Liberty Loan speakers, musical features

with our own band, and the use of a large clock in a conspicuous part of the plant showing the progress of the loan from day to day. One week is given to advertising prior to the week of the campaign.

"The group of salesmen are divided according to departments, and competition is thereby established not only among the departments themselves, but with the salesmen. The group is conducted to each shop in turn in the department, the power is turned off, and a short 10-minute speech is given. The personal solicitation by these outside salesmen is then reached by each one dealing with an individual. Missionaries, men who are most familiar with the department and whose work is to make the salesmen's work easier, immediately get into touch with all individuals in the shop in order that no one is slighted. Everyone in every shop is solicited. The missionaries' work is a powerful factor in connection with the salesmen's soliciting.

"It is endeavored to maintain the same personnel of salesmen throughout the entire week of the campaign. There is also a group called the follow-up group which makes a second cleaning after the salesmen have been through a department, and an emergency group stationed at headquarters for the request of different shops for individual salesmen to take individual subscriptions.

"Employees are privileged to pay cash or have deductions made from their pay which will continue over the shortest period of time in which the employee can be persuaded to pay for his bond. The moneys deducted are transmitted to the various banks with which the employees prefer to deal, and they hold the bond in custody until the whole amount is paid."

Buffalo Starts Enthusiastically

The third Liberty loan was given a spectacular start in Buffalo Saturday with a "Liberty Parade" through the principal streets, with airplanes flying overhead showering copies of the Liberty loan proclamation issued by the mayor. The parade was participated in by thousands of citizens, including city officials, Liberty loan workers, Home Defense Corps and numerous bands; also 16 divisions of women, mothers, wives and sisters of soldiers and sailors in service and in training, who bore service flags; Red Cross workers, the Woman's Motor Corps, in uniform; and divisions of Boy Scouts.

A Liberty ball of large dimensions, made of metal and painted red, white and blue, which is to be rolled from Buffalo to New York through the cities of the State, was started on its journey escorted by Boy Scouts and a drum corps.

One of the events of the parade program was the starting of the trip that will be made across New York State by the famous Liberty coach built in 1893 by James Gordon Bennett, which has traversed the now devastated regions of Belgium and France. Eighty-four cities and towns of the State will be visited en route. Posters containing Liberty loan appeals will be displayed on the sides of the coach, and an American flag flown from the back. Frank D. Lyon of Binghamton, former New York State highway commissioner, will direct the trip and will convey a message from Mayor Buck of Buffalo to Mayor Hylan of New York.

The iron and steel industries of Buffalo are represented in the third Liberty loan by a committee headed by Henry D. Miles, president Buffalo Foundry & Machine Co., as chairman, and comprised as follows:

Harry Yates, Buffalo Union Furnace Co.
Hugh Kennedy, Rogers-Brown Iron Co.
A. A. Landon, American Radiator Co., and president of the Chamber of Commerce.
Chas. R. Robinson, Lackawanna Steel Co.
Edward Kener, Jr., Buffalo Co-operative Stove Co.
S. B. E. McVay, Seneca Iron & Steel Co.
Fredk. C. Deming, Carnegie Steel Co.
M. E. Gregg, Republic Iron & Steel Co.
Eugene J. McCarthy, Beals, McCarthy & Rogers.
Wm. G. Houck, Buffalo Structural Steel Co.
C. A. Collins, Buffalo Union Furnace Co.
Stanley B. Lelong, American Radiator Co.
W. B. Enck, Donner Steel Co.
Theodore H. Wickwire, Wickwire Steel Co.
Henry W. Wendt, Buffalo Forge Co.
Grant King, Swing Machine Co.
Fredk. B. Cooley, New York Car Wheel Co.
D. J. Carson, Acme Steel & Malleable Iron Works.
E. C. Strong, Atlas Steel Casting Co.
Clarence H. Littell, Standard Foundry Co., and
Frank R. Moll, Ford & Enos, secretary of the committee.

The personnel of the committee is practically the same as the iron and steel industries committee for the second Liberty loan, which raised the largest amount of any of the classified industries committees in that city.

The total of the allotment for Buffalo on the present loan is $31,000,000.00.

Edward B. Holmes, president of the E. & B. Holmes Machinery Co., is a member of the Trades Advisory Committee, which represents all the industries of the city, and R. L. Crane of the Prentiss Tool & Supply Co. is chairman of the machinery division.

Manufacturers Busy

CINCINNATI, April 7.—The formal opening drive for the third Liberty loan was on April 5 at a general meeting held at the Hotel Gibson, which was attended by over 1500 people. The campaign program, as previously outlined, will be carried out in its entirety, but the large number of four-minute speakers who have volunteered their services has enabled the committee to select 68 men who will devote most of their time to manufacturing plants.

John H. Wood, of the Cincinnati Industrial Association, is stationed at the Liberty loan headquarters to make engagements for the speakers. The manufacturers are furnishing automobiles for conveying speakers from one plant to another and the program has been arranged so that no matter at what time the speaker arrives at a plant the employees are quickly assembled to hear his address.

The machine tool builders are taking an active interest in this campaign and all of them have arranged for the purchase of Liberty bonds by their employees on the instalment basis. It is generally believed that the campaign will be a very short one on account of the enthusiastic support given by the business men of this city.

Steel Companies Subscribe

The United States Steel Corporation has announced a $25,000,000 subscription to Liberty bonds and $10,000,000 additional will be taken for employees.

The Republic Iron & Steel Co. on Tuesday announced a subscription of $2,050,000.

Preparing for Foreign Trade Convention

Robert S. Alter, president of the Foreign Trade Association, Cincinnati Chamber of Commerce, called a meeting April 6 of the committee on arrangements for the coming Foreign Trade Council convention. Reports show that nothing has been overlooked for handling the convention that will be held at the Gibson Hotel April 18-20.

Mr. Alter states that many representatives of foreign countries will attend and that the entire official force of the Bureau of Foreign and Domestic Commerce will be on hand to aid exporters in their efforts to obtain foreign business. Special attention will be paid to the possibilities of Central and South American trade. A number of exhibits will be displayed by representatives from Spanish-American countries.

The Davenport Locomotive Works, Davenport, Iowa, has been awarded a contract for the construction of 80 light locomotives, 24-in. gage type, weighing 35,000 lb. each, to be used in transporting munitions in France. Delivery is to begin in August and be completed in November.

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Wages and Labor Supply

The problem of keeping the iron and steel industry supplied with labor is not an easy one. The maximum production of finished rolled steel in both 1912 and 1913, years before the war, was a trifle more than 23,000,000 gross tons. As there was a little idleness in each year, production during the major portion of the time was approximately 2,000,000 tons a month. Capacity for finished steel at the present time is about 3,000,000 tons a month, or one-half greater. There have been no important changes in methods or equipment whereby the amount of labor per ton of output would be materially reduced.

Where does the iron and steel industry secure its labor? Chiefly, in the past, from immigration. The American born, even those of the first generation, do not gravitate to the industry. Immigration during the fiscal years 1913 and 1914, just before the war, may be taken as more or less representative of normal pre war conditions. In the two years the net influx into the country of all persons was at the rate of about 720,000 a year or 60,000 a month. A similar movement from July 1, 1914, to January 1, 1918, would have meant about 2,500,000 persons. The actual increase in our population, due to passenger movement, was about 400,000 during the entire period. In the last six months in 1917 there was a net efflux of about 65,000 persons.

Many predictions have been heard of a "flood of immigration" into the United States after the war. Assuredly there can be no certainty about this. Something will depend upon the precise terms of peace, and much will depend upon the attitude of the respective foreign governments. It is fairly well understood that the present German intention is to retain her able-bodied population by force. Often governments may use force, or may find means to make remaining at home attractive pecuniarily and otherwise. Prospects of immigration into the United States are uncertain at best; but assuming that many do come, the mental attitude must be considered. It is idle to assume that employment of some sort will not be afforded at home. If the men merely want jobs, presumably they will be able to find them without coming to the United States. If they seek a quiet, settled life, if they yearn for a home and connection with the soil, they will hardly seek employment in the iron and steel industry.

Thus the prospect is that the labor supply shut off from the iron and steel industry in the past three and a half years will be largely lacking in the future, while there is employment for nearly one-half more men than before the war. The American born, as already noted, do not gravitate to the blast furnace and steel mill. If the mountain will not come to Mahomet, it is perfectly clear what it behooves Mahomet to do. Wages and working conditions that have been satisfactory to one class must be made satisfactory to another class if the other class is to be attracted. Wages in the industry have almost doubled in a trifle more than two years. Further increases are not impossible and it may prove desirable in some departments to change hours of labor, whereby rates per day may not increase, but cost per ton of output will increase. The change in conditions comes at a time when the industry is able to make it, in view of selling prices. A return to former wage costs per ton is out of the question unless in the course of years wonderful improvements, at the expense of capital investment, can be effected. Meanwhile the buyer of iron and steel products cannot look forward to a return of former prices in the open market.

New Standard Manganese Alloys

From a patriotic standpoint, the Government's suggestion of lower standards for ferromanganese and spiegeleisen should enlist the co-operation of all steelmakers. This is true not only because this course may free vessels from the manganese ore trade, but also because it will undoubtedly stimulate the use of a domestic product—low-grade manganese ores. Conservatism should be exercised, however, as to the extent to which this movement is carried. The change should come by degrees. While a certain supply of manganese ores is known to exist in this country, it is small relatively, and the extent to which it can be converted into suitable alloys is not established. Many of these ores are high in silica or in phosphorus. With an estimated annual need of 750,000 tons of high-grade ore, on the basis of last year's steel output, a proposition to cut the imports from Brazil to 25,000 tons

per month is surprising, when it is considered that about 90 per cent of the imports have come from that country during the war.

From a metallurgical standpoint the plan deserves all the encouragement possible. It has too long been a fixed idea that ferromanganese below a certain standard should not or could not be used. This is particularly the attitude of the uneducated steel melter. This barrier will be harder to break through when it it attempted to conserve manganese by somewhat radical changes in steelmaking processes. These changes are bound to come, but they should not come in war time unless forced. A large Western steel company has fully demonstrated the possibility and the desirability of using manganese-iron alloys of even lower standard than those now suggested. This and similar testimony was brought out by an investigation published in THE IRON AGE of Jan. 3, 1918. There are numerous cases to-day in which spiegeleisen could be used where ferromanganese is employed.

Adherence to ferromanganese is due to established custom or to the fact that the standard alloy continues to be obtainable; but alloys as low as 50 to 60 per cent manganese are entirely practicable in many cases, if impurities do not interfere. It is time to have the matter fully tested. The results may establish the fact that less manganese is necessary in some cases than is now thought advisable.

Democracy in Industry

A unique meeting was held in New York one evening last week. At this meeting it was announced that the Standard Oil Co. of New Jersey had decided to advance wages by about $3,000,000 per year, to establish annuities and sick benefits and to undertake the general improvement of living and working conditions at the plants of the company. All of this was interesting and important, but the most important fact was that the meeting was attended by officers and wage workers of the company as the result of a newly adopted plan of bringing employers and employees into closer and more cordial relations by the employees electing representatives to meet with representatives of the company. In other words, it is a movement toward establishing a democracy of industry, a plan not to do things *for* the employees, but to work *with them*. The company and the men propose to "work things out together."

Some time ago the company invited its employees to elect from their own number, by secret ballot, men in whom they have confidence to represent them in dealing with officers and other representatives of the company in matters of mutual interest, this election to be on the general basis of one representative to every 150 employees. The election was held the night and day of Wednesday, March 27, in order that both the day and night shifts might have an opportunity to vote. The men manifested the liveliest interest in the election and 92.2 per cent of the total number of wage earners voted.

At the meeting last week an elaborate "Outline of Labor Relations" was adopted by the joint action of representatives of the company and the men. This provides that joint conferences shall be held at each of the works at least quarterly to discuss any matters of mutual interest and all adjustments will be taken up at these conferences. It is specifically provided that wage adjustments shall be made in this way. Another very important feature provides for justice in the matter of discharges and suspensions. A list of offenses for which employees may be suspended or dismissed without notice include violation of the law, violation of certain safety rules, failure to report accidents, insubordination and other serious offenses; but the foreman has no summary rights even against such offenders. Any employee who feels that he is unjustly treated has a right to appeal to the general superintendent and higher officials of the company. He is not compelled to go to the foreman at all and his elected representative can act for him. Provision is made for extreme care in hiring as well as in regard to discharging. There is to be no discrimination on account of membership or non-membership in any church, society, fraternity or union.

While the company aims to co-operate in improving methods of living, it proposes to do so by working with the men. The plan for annuities and benefits has been worked out thoroughly and in great detail.

On the whole, this new departure of the Standard Oil Co., of which only the most important features are given above, is full of promise. The justice of the claim of employees that they are entitled to representation is conceded, but the domination of a body outside of the employees of the company is not recognized. A similar plan has been tried with a very fair degree of success at the plants of the Colorado Fuel & Iron Co., and doubtless in perfecting the plan of the Standard Oil Co., minor errors connected with the Colorado plan have been avoided. The outcome of the experiment which has just been most auspiciously inaugurated will be awaited with the keenest interest by employers and employees throughout the country.

Pig-Iron Production Prospects

The monthly report of pig-iron production in last week's IRON AGE showed that in March the blast furnaces made one of the most remarkable recoveries on record. From the low average of 77,799 tons daily in January production rose to 82,835 tons in February and then jumped to 103,648 tons in March. The increase from February to March was no less than 25 per cent, but there was really a greater gain than that over the minimum, for the production in the second half of January and in the first half of February was at a lower rate than in either of the two full months. The March rate was the best monthly rate since November. It was only 1 per cent below the average rate in 1917 and only 3 per cent below the average rate in 1916. As much more furnace capacity was available last month, however, there was really considerable idle capacity. Curtailment in pig-iron production has been due almost wholly to shortage of coke, and therefore it should be of interest to locate the shortage, if possible. The high record is held by October, 1916, the

blast furnace report of THE IRON AGE showing an average daily output for that month of 113,189 tons. Comparing that month with last month, a decrease of 8.5 per cent is shown. The changes in important districts were as follows, in detail:

	Per Cent
Schuylkill Valley	—25
Pittsburgh District	—19
Shenango Valley	—19
Wheeling District	—19
Mahoning Valley	—11
Alabama	— 8
Lehigh Valley	— 4
Lower Susquehanna and Lebanon Val's.	— 4
New York	— 4
Central and Northern Ohio	— 3
Chicago District	0
Maryland, Virginia, Kentucky	0
Tennessee	+ 5
Western Pennsylvania	+ 6
Hocking Valley and Hanging Rock	+31

The districts which lost most in production are those which draw their coke largely from the Connellsville region. The Mahoning Valley depends more on by-product coke than does the Shenango Valley, and lost somewhat less than its companion valley. That Tennessee should have gained while Alabama lost must have been due to special conditions of no general importance. When pig-iron production was smallest, in January and February, Alabama fell back only a trifle, while production in the districts dependent largely upon Connellsville fell off very sharply indeed. On account of exceptional weather at Chicago at the beginning of January, that district produced less than half as much pig iron in the month as in either October, 1916, or last month.

It is clear that the shortage of Connellsville coke, which was due to traffic congestion, has been chiefly responsible for the curtailment in pig-iron production, but it is also clear that that has not been the sole cause.

In connection with shortage of coke, a fact of no small importance is to be borne in mind, that when the supply is irregular the production of pig iron decreases more than does the supply of coke, for the reason that the coke consumption per ton of pig iron increases. In 1916 there was produced 54,533,585 net tons of coke and 39,434,797 gross tons of pig iron. The American Iron and Steel Institute report shows that the blast furnaces consumed 44,431,905 tons of this coke. There is no particular reason for supposing that in 1917 the consumption of coke outside the blast furnace industry was greater than in 1916. By the rule of three the output of 38,647,397 tons of pig iron last year should have been accompanied by the production of 53,400,000 tons of coke, but the Geological Survey has estimated the 1917 coke production at 3,200,000 tons more than that.

In last week's IRON AGE there was printed a revised list of by-product coke ovens built and being built. In round figures it indicates that at the beginning of 1917 there was about 21,500,000 tons by-product capacity and at the close of the year 4,500,000 tons additional. As the Geological Survey reported the by-product output at 19,069,361 tons for 1916 and estimated it at 22,600,000 tons for 1917 the capacities cited are quite in keeping with actual performance and may be accepted with some confidence as representative.

That there is ample coking capacity to furnish a full supply of coke for the existing furnaces is, of course, well known. The building of by-product ovens has greatly outrun the building of blast furnaces. The beehive ovens are in course of being replaced by by-product ovens. The shortage has been of transportation, not of ovens. An inside estimate of capacity can be made by taking the 1916 production, 35,464,224 tons of beehive and 19,069,361 tons of by-product, or 54,533,585 tons altogether, and allowing for the new by-product ovens of 1917, which would add 4,500,000 tons. That would account for about 4,000,000 tons of pig iron over the 1916 production, making fully 43,000,000 tons. The estimate of coke capacity is inside the fact by the amount that 1916 production was below the capacity at the end of the year, and that was a considerable item, seeing that fully a thousand by-product ovens were completed at various times during that year.

The United States Steel Corporation expects to be making coke before July 1 at three new by-product plants—Clairton with 640 ovens, Lorain with 208 and Cleveland with 180, a total of 1028 ovens, having 4,500,000 to 5,000,000 tons capacity; and independents should complete, within a few months, 582 ovens with about 2,500,000 tons capacity. With ample capacity already, for a production of 43,000,000 tons of pig iron, there is at least 7,000,000 tons additional coking capacity due within a very few months.

Inasmuch as transportation is under control of the Government and the Government is interested in the operation of by-product rather than beehive ovens, it is reasonable to assume that matters will be so arranged in general that the by-product rather than the beehive ovens will be given the opportunity to operate at capacity. The 43,000,000 tons mentioned in connection with pig iron is approximately the existing capacity, on the basis of 39,434,797 tons produced in 1916, with four new stacks blown in during the year and contributing part of their capacity, while in 1917 14 new stacks were blown in, and last month three additional new stacks became operative.

Industrial Fire Losses

Attributing the origin of industrial fires to the German spy system has become habitual with the general public. As a matter of fact, the part played by the hostile plotter in starting factory fires is relatively insignificant. Seventy-five fires at manufacturing plants in the nine war months of 1917, entailing a loss of $43,558,000, were blamed on enemy agents in a summary prepared by a reliable New York daily paper. But investigation by the National Board of Fire Underwriters has shown that only 4 were incendiary, 6 of suspicious but unknown origin, 23 of unknown but not suspicious origin, while 42 were definitely ascribed to causes of non-incendiary character.

However, the possible check to the country's output of war supplies from disastrous fires, not necessarily large in extent, but affecting important processes, should not be minimized. That spies and

hirelings of the enemy would work greater danger if vigilance were relaxed goes without saying. The precautions described in THE IRON AGE of April 4 which have protected one important munitions plant, not only from plotters but also against ordinary fire hazards, are therefore worthy of careful attention.

The enemy firebrand must be hunted unremittingly, but it is well to bear in mind that careless men and women are still the arch offenders, the lighters of "the great American bonfire" which costs over $200,000,000 annually, a loss equal to the interest on two Liberty loans. The percentage of this loss sustained by manufacturing industries is not known, but an analysis of fires in 1916 in the industrial States of Massachusetts, Rhode Island, Connecticut, New York, New Jersey and Pennsylvania, shows that 28 per cent were entirely preventable, 44 per cent partly preventable, and 28 per cent of unknown origin.

From the viewpoint of fire prevention, there is always a cause for a fire but never an excuse, and on this basis all destruction by fire should be done away with. The obstacles are the manager who is blissfully confident that the next plant to lie in ashes will not be his, and the workman who carelessly smokes, throws rubbish in a corner, or otherwise violates common sense. Mental slackers of these types are at the present time of more aid to the enemy than his whole corps of incendiaries.

Proposed Control of Ores

WASHINGTON, April 9.—To encourage the production, conserve the supply and control the distribution of those ores, metals and minerals which have formerly been largely imported or of which there has been an inadequate supply, the Committee on Mines and Mining has prepared a bill placing producers and distributers under the jurisdiction of the Secretary of the Interior, who is authorized to exercise practically unlimited powers to render the output of these products contributory to the war. The list of metals and minerals to be controlled include antimony, arsenic, ball clay, bismuth, bromine, cerium, chalk, chromium, cobalt, corundum, emery, fluorspar, ferro-silicon, fullers earth, graphite, grinding pebbles, iridium, kaolin, magnesite, manganese, mercury, mica, molybdenum, osmium, sea salt, platinum, palladium, paper clay, potassium, pyrites, radium, sulphur, thorium, tin, titanium, tungsten, uranium, vanadium, zirconium, and other rare and unusual elements, the supply of which may in the judgment of the President be inadequate for war and industrial needs.

The bill will carry an appropriation of $50,000,000 to be used as a revolving fund, with which the Secretary of the Interior, with the approval of the President, may purchase the articles mentioned and shall turn them over to other departments of the Government for war purposes or sell them to citizens of the United States or to the allied Governments. In this connection, the President is authorized to fix the prices of the articles which it is proposed to control and to establish rules for their production, distribution and apportionment.

Opening of the first course of intensive training in employment management under Government supervision at the University of Rochester has been announced by the Council of National Defense. Fifteen Rochester factories are providing the laboratory work. The first students are 20 prospective employment managers sent by manufacturers having Government contracts, and some of the Government departments, to take a six weeks' course.

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Light on the Steel Situation at Shipyard

Hog Island Calls for 60,000 Tons Per Month—Estimates Show Ample Plate Capacity to Care for Every Demand

WASHINGTON, April 9.—Notwithstanding the statement that one-half the capacity of the plate mills of the country is sufficient to supply material for the building of 12,000,000 tons (dead weight) of ships per annum a number of the leading shipbuilding plants, including the Government owned yards engaged in the construction of fabricated ships, have been forced to slow down for lack of plates. To meet this grave emergency the War Industries Board, through the Priorities Committee, has taken all possible steps to hasten plate deliveries. Shipments of fabricated material to the yards have been given right of way over all other freight, the movement of plates from the mills to the fabricators has been similarly expedited, and in addition to providing transportation for the products of the furnaces on which the plate mills are depending, the Priorities Committee, the Fuel Administration, and the Director General of Railroads are all cooperating in providing a 100 per cent supply of coke and coal. It is believed that the measures taken so energetically will speedily result in providing the shipyards with an ample supply of plates, as it is recognized that the difficulty is not due to shortage of capacity (though it is to be remembered that plate capacity and ship plate capacity are two different things), but rather to lack of co-ordination and the maintenance of fuel supply and transportation facilities.

The Situation Not Rightly Stated

Although publications in the daily press have produced the erroneous impression that the demands of the shipbuilders upon the plate mills are in excess of their capacity in view of other governmental and commercial requirements, the authorities here are fully informed as to the exact situation. The matter was first brought to the attention of the Shipping Board early in March when the managers of the Hog Island and other shipyards notified the officials here that owing to the progress made in the construction of shipways, the demand for steel plates promised greatly to exceed the prospective supply owing to the irregular movement throughout that branch of the industry supplying the fabricating shops. The Shipping Board at once sent for representatives of the fabricating shops, the plate mills, steel works and furnaces and speedily acquired full information concerning the situation. The War Industries Board was then called upon to take the matter up through the Priorities Committee, and steps were at once taken to bring plate deliveries up to 100 per cent of the requirements of the shipyards.

Hog Island Deliveries 50,000 Tons Behind

A detailed statement of the difficulties encountered by the shipyards in securing an adequate supply of plates was made before the Senate Committee on Commerce during the past week by George J. Baldwin, vice-president of the American International Corporation and chairman of the board of the American International Shipbuilding Corporation. Mr. Baldwin told the committee that he did not believe the Shipping Board, the War Industries Board or the Priorities Committee had appreciated the speed at which the Hog Island yard had been built, and for this reason the Government had failed to provide a supply of steel when it was needed. At the Hog Island yard, he said, twenty shipways had been ready for keels since March 15, so that a fortnight had been lost on the entire shipbuilding program of the yard for lack of material.

"We are to-day just about 50,000 tons of steel behind our schedule," said Mr. Baldwin. "We ought to have a bank of steel in that yard that we can draw from. You cannot take steel right from a railroad train as it comes in and put it into your vessel. You must have all the different parts of the vessel there to draw from. That means quite a reservoir of steel amounting to a good many thousand tons."

Mr. Baldwin's statement at once aroused the interest of every member of the Senate committee, several of whom simultaneously demanded to know whether the failure of the fabricators to secure material was due to delays in production or in transportation.

Plate Capacity, 6,000,000 Tons

"The steel men tell us," replied Mr. Baldwin, "that on July 1 of this year the plate capacity of this country will be 6,000,000 tons per annum and that it is now approximating that figure. About half of that would necessarily be required for cars, tin plate [!] and all the various uses of plate. The other half could be available for ships. That is 3,000,000 tons. That 3,000,000 tons would build 12,000,000 tons of ships; so that the capacity of the rolling mills is there. The rolling mills claim—and I thing this is true—that they have not been getting the steel from the steel producers in some cases. In some cases they are the same company, and in other cases they are different companies. The trouble there seems to be that they have not been getting the coke for use in their furnaces, and therefore they have had to close down and could not, until now, begin to ship the steel to the rolling mills and from the rolling mills to the fabricators. Then, when they have shipped the steel from the original steel mill, the transportation to the rolling mill is slow. Sometimes, when it is not the same plant, the transportation from the rolling mill to the fabricator is slow; and, while I cannot give the exact figures, there is something like twenty times as much steel started as we have got in the yard, most of which ought to be in the yard to-day, but which has been delayed all along the route.

"You will see that a large part of our material is in transit, a difficulty that dates back to last winter, a difficulty of the same kind that we experienced in getting our material into the yard, where we found wrong quantities, wrong shapes, etc. The fabricators have had these same troubles and sometimes they have had 1000 tons of steel on hand all ready to fabricate and yet which they have been obliged to hold in their yards because they cannot get some little pieces of steel that go with it and must be fabricated with it before it can be shipped to us.

"The difficulty in a nutshell is a lack of proper direction of transportation and priority in orders. It seems to me that the one immediate essential is the demand by this committee to-day, and not to-morrow, that ships should be put on the first priority and that steel should flow to every shipyard just as fast as that yard can properly and adequately use it. It seems to me that nothing ought to be allowed to stop that."

First Priority for Ship Steel

"What is the Priorities Committee moving ahead of steel at the present time?" asked Senator Ransdell.

"I cannot tell you in detail, but my understanding is that shipbuilding has been sixth on the priority list."

"Your idea is that there ought to be some central authority to order these things?" asked Senator Nelson. "You believe a single authority should order the supply of coke and cars and steel?"

"I do not see any other way to get it there."

"And now you have to go in two or three direc-

tions, or to two or three different places to get action?"

"Yes, and each gentleman we see proves that it is some other gentleman's trouble."

"I think I can see the situation you describe," commented Senator Nelson. "You have to go to this Priority Board and then you have to go to the board that furnishes the material and then to another board. I call the attention of the committee to this as evidence of the necessity for the passage of the Overman bill permitting concentration of executive authority."

"I do not think," continued Mr. Baldwin, "that our difficulties are the fault of any one of these organizations, but I do think that there should be some single authority to appeal to. If I give an order in my company, it is obeyed; there is no question of anybody interfering with it and the stuff goes through as I order it; and if it does not I know whom to blame and whom to put my finger on. But if I had a dozen men giving orders it would be very different and nothing would be done.

Hog Island Wants 60,000 Tons a Month

"We are ready to use up steel in our yard at a rate that I do not believe anybody realizes. We want 60,000 tons a month in that plant for the next three months, but although I think Admiral Bowles appreciates the situation and is urging that we be supplied, the best promise we can get so far is that we shall probably be able to receive what we ordered for this month, but not be permitted to catch up on our arrears."

"Is the work of your yard more in advance of the deliveries of steel than other yards, so far as you know?" asked Senator Ransdell.

"My personal impression is that we are a little worse off than most of them, because I think that the people who are shipping steel have never realized that we were going to use so much of it or begin to use it so early. They have thought that we have bitten off more than we can chew, so they propose to ship half of what we ask for, believing that would be all we could use. I think the Submarine Boat Corporation is behind and that most of the yards having merchant construction need steel, although some of them have obtained a very good supply."

"You are up against the same difficulty that we are all up against in trying to get anything done," commented Senator Jones.

Immediately upon the conclusion of Mr. Baldwin's statement, Senator Harding proposed the following motion, which was unanimously adopted:

"That the chairman of this committee be instructed to invite the attendance of the chairman of the United States Shipping Board and the chief executive official of the Emergency Fleet Corporation and that they call upon the President of the United States and ask his assistance and co-operation in meeting this great emergency that exists for shipbuilding material."

Following the action of the Senate committee the Priorities Committee of the War Industries Board held a session at which the instructions above outlined were ordered to be sent out by the Director General of Railroads, the Fuel Administration, and the Shipping Board. Mr. Replogle, in charge of steel purchases, at once put himself in communication with the principal plate mills and steel works engaged in supplying the fabricating shops and directed them to spare no effort to obtain a maximum output of plates and not only to maintain current deliveries, but also to make up shortages wherever the supply has fallen behind.

W. L. C.

The estate of W. I. Babcock and Babcock & Penton, consulting naval architects and engineers, 120 Broadway, New York, and Penton Building, Cleveland, announce that their business will be discontinued May 1. Communications may be addressed to H. Penton, Penton Building, Cleveland, who is in charge of shipbuilding on the Great Lakes for the Government.

The Queen City Foundry Co., Denver, Colo., will install a new electric steel furnace at its works, for increased capacity.

Suggested New Standards for Manganese Alloys

The following statement and series of questions have been sent out by the Sub-committee on Ferroalloys of the War Industries Board to all consumers of ferromanganese and spiegeleisen in the United States:

The War Industries Board and the Shipping Board have called the attention of the Ferroalloys Committee to the critical situation existing in ocean tonnage and the necessity of immediately further reducing the imports of manganese ores. There has already been a curtailment of approximately 50 per cent of the shipping formerly utilized for importing these ores.

The committee desires to emphasize to the steelmakers of the country the necessity of the use of domestic manganiferous ores to the maximum extent possible, in the manufacture of spiegeleisen and ferromanganese. In order to reduce the importation of manganese ores and thus effect the necessary conservation in shipping, it will be necessary for the duration of the war to adopt the use of a lower standard manganese content in ferromanganese and spiegeleisen used for recarburizing steel.

A general application of the use of spiegeleisen in place of ferromanganese for all steels above about 0.40 per cent carbon is suggested, especially in cases where the manufacturer is producing a large tonnage of such grades of steel.

The committee has under consideration the recommendation of 70 per cent for standard ferromanganese, with a proper scale for units above or below 70 per cent. Similarly, it is proposed to recommend a standard of 16 per cent spiegeleisen, with a proper scale above and below 16 per cent. We believe that 70 per cent ferromanganese and 16 per cent spiegeleisen are practical for a large percentage of the trade, and calculated to make available a greater tonnage of domestic and nearby imported ores not now available.

We recommend also that wherever possible ferromanganese down to a minimum of 70 per cent manganese and spiegeleisen down to a minimum of 16 per cent be accepted as good deliveries on present contracts, with a proper deduction for lower manganese content.

This is not a matter of convenience or economy, but one of absolute necessity. The committee requests that after consultation with your metallurgists you furnish the information requested in the following questions, so that some estimate may be formed as to what extent the practice of steel works can be modified to meet the suggested standards. We believe it is possible for practically all steelmakers to change their practice.

We rely upon you for a prompt response, giving the information desired by this committee and the Government, and solicit your hearty co-operation and patriotic support in putting into effect as promptly as possible the changes required by the situation that confronts us.

The statement is signed by James A. Farrell, chairman. The questions referred to are as follows:

1. What percentage of steel produced by your company is recarburized with ferromanganese?
2. What percentage of steel produced by your company is recarburized with spiegeleisen?
3. What tonnage of steel do you manufacture monthly above 0.40 per cent carbon and what percentage of this tonnage is recarburized with spiegeleisen?
4. (a) If you are not using spiegeleisen in recarburizing steel of 0.40 per cent carbon and above, why not? (b) If not equipped with cupolas, etc., for this method, what time will it require to equip your plant?
5. Can you not use 60 to 70 per cent ferromanganese in recarburized steels below 0.40 per cent in carbon, and if not, why not?
6. We will appreciate any suggestions you may make as regards analysis of proposed standard grades and the uses thereof.

In THE IRON AGE, Jan. 3, 1918, the question of the use of spiegeleisen in place of ferromanganese was discussed in connection with replies to questions sent by this journal to about 70 ingot and steel-casting makers in this country. Some interesting testimony was given to the effect that spiegeleisen is available for certain uses, though its consumption is not as general as it might be.

Iron and Steel Markets

WAR WORK FILLING MILLS

Great Expansion in Large Gun and Large Shell Program

Pressure on the Mills for Ship Plates—Increasing Absorption of Steel in War Needs

A meeting of coke interests in northern Ohio and western Pennsylvania will be held at Washington Thursday to arrange for supplying northern Ohio foundries with the McKinney Steel Co.'s by-product coke, releasing Connellsville foundry coke for shipment eastward. Already in the case of blast furnace coke, the two districts have co-operated to prevent cross-hauling.

The Connellsville region had a 100 per cent car supply on the first three days of this week, the first situation of the sort in many months. Coke supply in the East is better and the wants of the smaller furnaces in eastern Pennsylvania that have suffered for three months are at last getting attention.

The most significant development of the week is the definite shaping of Government plans for the immediate building of larger gun works than the United States has to-day and for a corresponding increase in the manufacture of the largest shells at new plants. The new artillery program will include many 16-in. howitzers mounted on trucks. Their manufacture is likely to be undertaken by a great interest not now engaged on guns, and deliveries are not counted on before late 1919 or early 1920.

This first week of the country's second year in the war is thus marked by the clearest indications yet given that American steel output will at length be so far taken up by the Government and its Allies as to leave little for so-called ordinary uses either at home or abroad.

The vast enlargement of the nation's offensive preparations that has come in the fortnight has already stirred the machine tool trade. Great activity is looked for also from the doubling of the output of various shell plants, by Government order, and the call for large numbers of motor trucks to be sent at once to France.

Steel mills have been under pressure from Washington in the past week in an effort to have January and February shortages made up, particularly those in plates. The mills have had the help of a better car supply, which in the Pittsburgh district has been especially fortunate in view of the large proportion of output required by the Government. The leading producer there has turned nearly 90 per cent of its recent production into Government and war contract channels, and several plants in the same district that lately have given 60 to 75 per cent of their production to such business are now considerably exceeding these figures.

Great Britain's call for 300,000 tons of ship steel is growing more urgent and for part of this special consideration has been ordered. A large order of shell steel for the Allies is also awaiting distribution. Meantime an arrangement has been made under which the inquiries of Canadian roads for 285,000 tons of rails will be withdrawn from the market. Much of this will be placed in Canada and mills here will relieve those in Canada of a large quantity of shell steel.

Every week's delay in the placing of the 100,000 cars that have long been scheduled at Washington increases the chances of repeating next winter the disastrous traffic breakdown of January and February. Should these orders be given out tomorrow, weeks would be required for the manufacture of car appliances on which plants partly idle should now be at work. Precious time is being lost without good reason.

Steel ingot production in March is estimated at more than 3,525,000 tons, on the basis of returns from 29 companies making 85 to 90 per cent of the total. This represents an increase of 30 per cent over the average for January and February, and is parallel with the remarkable recovery in pig-iron production.

Inquiry for Lake Superior manganiferous ores has sprung up at Cleveland, in view of the Government plan which will reduce the importation of Brazilian manganese ore. There is warrant for the feeling that while the supply of manganese materials will give no concern for some months, even with the shrinkage of British shipments of ferromanganese, a drastic curtailment of ore imports from Brazil may be felt later in the year.

The lowering of ferromanganese and spiegeleisen standards, in the move to use lower grade domestic ores, has resulted promptly in a higher price per unit of manganese, sales having been made in the Central West at $282 for 80 per cent ferromanganese, as against a recent price of $250.

The chief item of interest in ship plates is the settlement under which 200,000 tons will go to Japan. Half of this is to be covered by existing contracts, with much of the material now in storage on the Pacific coast ready for immediate shipment, and half is to be put through under new contracts.

The South is experiencing a car shortage due to a diversion of empties westward. Pig-iron producers late last week received assurances of relief, much of the iron being needed for Government work.

Pittsburgh

PITTSBURGH, April 9—(*By Wire*).

The best word that has come to the steel trade in a long time is the fact that on Monday, Tuesday and Wednesday of this week there was a 100 per cent supply of cars in the Connellsville region, this being the first time in many months that this has occurred. The supply of cars on those three days was really larger than there was coke to load them, but the chances are that for the remainder of the week the car supply will fall off. Finishing mills also report that the supply of cars, and this includes box cars, is better now than at any time since last fall, and the heavy stocks of finished steel products that were piled in mill warehouses in January and February are steadily being reduced. There is still room for further betterment in the car supply, but the trade is grateful that it has improved to the extent noted above. The

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Apr. 10 1918	Apr. 3 1918	Mar. 13 1918	Apr. 11 1917
No. 2 X, Philadelphia	$34.25	$34.25	$34.25	$41.00
No. 2, Valley furnace	33.00	33.00	33.00	40.00
No. 2 Southern, Cincinnati	35.90	35.90	35.90	37.90
No. 2, Birmingham, Ala	33.00	33.00	33.00	35.00
No. 2, furnace, Chicago*	33.00	33.00	33.00	39.00
Basic, deliv., eastern Pa	32.75	32.75	33.75	38.00
Basic, Valley furnace	32.00	32.00	33.00	40.00
Bessemer, Pittsburgh	36.15	36.15	37.25	42.95
Malleable, Chicago*	33.50	33.50	33.50	39.00
Malleable Valley	33.50	33.50	33.50	39.00
Gray forge, Pittsburgh	32.75	32.75	32.75	37.95
L. S. charcoal, Chicago	37.50	37.50	37.50	38.75
Rails, Billets, etc. Per Gross Ton:				
Bess. rails, heavy, at mill	55.00	55.00	55.00	38.00
O.-h. rails, heavy, at mill	57.00	57.00	57.00	40.00
Bess. billets, Pittsburgh	47.50	47.50	47.50	75.00
O.-h. billets, Pittsburgh	47.50	47.50	47.50	75.00
O.-h. sheet bars, P'gh	51.00	51.00	51.00	77.50
Forging billets, base, P'gh	60.00	60.00	60.00	100.00
O.-h. billets, Philadelphia	50.50	50.50	50.50	70.00
Wire rods, Pittsburgh	57.00	57.00	57.00	85.00
Finished Iron and Steel, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	3.685	3.685	3.685	3.659
Iron bars, Pittsburgh	3.50	3.50	3.50	3.50
Iron bars, Chicago	3.50	3.50	3.50	3.25
Steel bars, Pittsburgh	2.90	2.90	2.90	3.75
Steel bars, New York	3.095	3.095	3.095	3.919
Tank plates, Pittsburgh	3.25	3.25	3.25	5.75
Tank plates, New York	3.445	3.445	3.445	5.919
Beams, etc., Pittsburgh	3.00	3.00	3.00	3.75
Beams, etc., New York	3.195	3.195	3.195	3.919
Skelp, grooved steel, P'gh	2.90	2.90	2.90	5.25
Skelp, sheared steel, P'gh	3.25	3.25	3.25	5.50
Steel hoops, Pittsburgh	3.50	3.50	3.50	4.25

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

Sheets, Nails and Wire, Per Lb. to Large Buyers:	Apr. 10 1918 Cents	Apr. 3 1918 Cents	Mar. 13 1918 Cents	Apr. 11 1917 Cents
Sheets, black, No. 28, P'gh	5.00	5.00	5.00	5.50
Sheets, galv., No. 28, P'gh	6.25	6.25	6.25	7.25
Wire nails, Pittsburgh	3.50	3.50	3.50	3.20
Cut nails, Pittsburgh	4.00	4.00	4.00	3.75
Fence wire, base, Pittsb'gh	3.25	3.25	3.25	3.15
Barb wire, galv., Pittsb'gh	4.35	4.35	4.35	4.05
Old Material: Per Gross Ton:				
Carwheels, Chicago	$29.00	$29.00	$30.00	$24.00
Carwheels, Philadelphia	29.00	29.00	30.00	25.00
Heavy steel scrap, P'gh	28.50	28.50	30.00	30.00
Heavy steel scrap, Phila	28.00	28.00	29.00	25.00
Heavy steel scrap, Chicago	29.00	29.00	29.50	27.00
No. 1 cast, Pittsburgh	29.00	29.00	30.00	24.00
No. 1 cast, Philadelphia	29.00	29.00	30.00	26.50
No. 1 cast, Ch'go, net ton	27.50	27.50	26.75	20.25
No. 1 RR. wrot., Phila	34.00	34.00	35.00	35.00
No. 1 RR. wrot., Ch'go, net	30.36	30.36	30.75	29.50
Coke, Connellsville, Pet Net Ton at Oven:				
Furnace coke, prompt	$6.00	$6.00	$6.00	$8.00
Furnace coke, future	6.00	6.00	6.00	8.00
Foundry coke, prompt	7.00	7.00	7.00	10.00
Foundry coke, future	7.00	7.00	7.00	9.00
Metals, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	23.50	23.50	23.50	33.00
Electrolytic copper, N. Y.	23.50	23.50	23.50	33.00
Spelter, St. Louis	*6.75*	7.00	7.50	10.00
Spelter, New York	*7.00*	7.25	7.75	10.25
Lead, St. Louis	*6.90*	7.00	7.10	9.15
Lead, New York	*7.00*	7.20	7.25	9.35
Tin, New York	85.00	85.00	85.00	54.62½
Antimony (Asiatic), N. Y.	*12.75*	13.00	13.25	36.00
Tin plate, 100-lb. box, P'gh	$7.75	$7.75	$7.75	$8.00

shortage in supply of labor of all kinds seems to be getting more acute, and the shipping heads of industrial plants are being put to their wits' ends to keep their labor supply filled up. Recently at several of the larger tin plate and sheet mills the men employed in loading cars failed to report for duty, and rollers, heaters and other employees worked from Saturday afternoon until early Monday morning without intermission loading sheets and tin plate, so that badly needed shipments could be made. There seems to be no doubt that the shortage in common labor will be worse, and the fact that such labor is now earning close to $4 per day does not seem to increase the supply.

The Government demands for iron and steel for all kinds are steadily getting heavier and almost the entire output of many steel plants that for some time have been giving the Government 60 to 75 per cent of their output is now being taken by the Government, and will be for some months. The Carnegie Steel Co. is giving more and more of its products of plates, bars, shapes and other finished material to the Government on direct and indirect orders than at any time since the war started, and at present probably 90 per cent of the great output of this company is on Government contracts. This is also largely true of the Jones & Laughlin Steel Co., the Crucible Steel Co. of America and other large steel interests, and the outlook now is that in the second half of the year the Government demands for steel will be even heavier than they were in the first half. The amount of business being placed by the general trade is still very light, and does not show signs of an early increase. Buying is largely from a hand-to-mouth nature. There is no incentive for consumers to buy ahead. Mills are well sold up over second quarter and seem somewhat indifferent about entering business for third quarter. The market is absolutely devoid of anything of special interest. Prices are standard, and developments are only of a routine nature. It is expected that within the next few days the blast furnace and steel companies in the Pittsburgh, Youngstown and other districts will announce an advance in wages of 15 per cent to correspond with that given out by the Steel Corporation recently, to go into effect on April 15. The Jones & Laughlin Steel Co. has already announced that it will grant this increase.

Pig Iron.—All kinds of inquiries are in the market for Bessemer and basic iron, with practically none to be had. The Trumbull Steel Co. has an inquiry out for 15,000 to 20,000 tons of basic iron per month over last half of the year, this iron being wanted for its new open-hearth steel plant, which is nearly completed, one or two furnaces having already been started. The Union Steel Casting Co. wants 5000 to 10,000 tons of Bessemer for last half of this year, and the N. & G. Taylor Co., Cumberland, Md., is inquiring for 1000 tons or more of basic iron per month over last half. The Andrews Steel Co., Newport, Ky., has an inquiry out for 20,000 to 25,000 tons of basic iron for last half, and there are other numerous smaller inquiries. It is believed the great shortage now existing in the supply of Bessemer and basic iron will be relieved to some extent in the near future, as the operations of the blast furnaces are steadily improving. At this time the Carnegie Steel Co. is operating 49 of its 59 blast furnaces, having started since April 1 Neville Island furnace and Isabella No. 1, both in Pittsburgh, and also No. 4 stack at Newcastle, Pa. The National Tube Co. has only one furnace idle and it will soon be started. The Jones & Laughlin Steel Co. has one Aliquippa stack out for relining and repairs, and it will be started as soon as ready. The great increase in output of pig iron in March was a surprise to the trade, and if the rate of increase shown in March is even slightly increased, it is predicted that by July 1 the shortage in supply of pig iron will be greatly relieved. Prices on pig iron in effect for second quarter are as follows:

Basic pig iron, $32; Bessemer, $35.20; gray forge, $32; No. 2 foundry, $33; No. 3 foundry, $32.50, and malleable,

$33.50, all per gross ton at Valley furnace, the freight rate for delivery in the Cleveland and Pittsburgh districts being 95c. per ton.

Billets and Sheet Bars.—A leading local steel interest that has been in distress for steel for some time has been able to find a fairly large quantity of cold ingots, which it will have shipped to one of its steel mills. This same interest is still in the market for any steel it can find, but with very slim prospects of getting more. The shortage in the supply of basic steel is getting more acute as the Government demands grow heavier. The Government is now taking nearly every pound of basic steel made by four or five of the leading producers, and will no doubt continue to do so over the remainder of this year at least. Bessemer steel is being more largely substituted for basic wherever possible, and more Bessemer sheet bars are being used by sheet and tin plate mills and other consumers than in a long time. Deliveries of steel to the finishing mills are better owing to the increase in supply of cars.

We quote 4 x 4 in. soft Bessemer and open-hearth billets at $47.50, sheet bars $51, forging ingots $73, and forging billets $60 base, all f.o.b. at mill, Pittsburgh or Youngstown.

Ferroalloys.—The Shipping Board at Washington has suggested to the War Trade Board that the sending of so many boats to Brazil for manganese ore be stopped as far as possible, as these boats are badly needed for war uses in the transportation of food and troops to France, and for this reason the development of domestic ores for the manufacture of ferromanganese will now be carried on on a much larger scale than ever before. These domestic ores are not as rich as the imported ores, and the producers of domestic ferromanganese have asked domestic consumers to agree to take 70 per cent ferromanganese in place of 80 per cent, and they probably will agree to do so, accepting this as a war measure. There is also a scarcity of spiegeleisen, and the average analysis on this, which is formerly 18 to 22 per cent, has been reduced to 16 to 18 per cent. The price of 70 per cent domestic ferromanganese is now very firm at $250 per ton, delivered, and sales were reported at 1000 tons or more at that price. It is stated that as high as $290 is being asked for 80 per cent, but we do not hear of any sales at that figure. Prices on 50 per cent ferrosilicon are very firm at $175 at furnace, the furnace usually absorbing the freight to point of delivery, and 16 to 18 per cent spiegeleisen is very firm at $70 at furnace. Sales of considerable quantities are reported at this price.

We now quote 9 per cent Bessemer ferrosilicon at $54, 10 per cent $55, 11 per cent $58.30, 12 per cent $61.60. We quote 6 per cent silvery iron $40, 7 per cent $42, 8 per cent $44.50, 9 per cent $47, 10 per cent $50. Three dollars per gross ton advance for each 1 per cent silicon for 11 per cent and over. All the above prices are f.o.b. maker's furnace, Jackson or New Straitsville, Ohio, these furnaces having a uniform freight rate of $2 per gross ton, for delivery in the Pittsburgh district.

Steel Rails.—The two local mills rolling standard sections and light rails expect some heavy orders to be placed by the Government within a short time. It is said the Government intends to rehabilitate some of the leading roads whose equipment is very badly run down and if this is carried out it means large quantities of rails and other track equipment will be needed. The new demand for light rails from the lumber interests is particularly heavy, and the larger coal interests are also buying light rails quite freely. The Government price for this quarter on 25-lb. to 45-lb. sections is $3 per 100 lb., f.o.b. Pittsburgh. There is no Government price on standard sections.

Structural Material.—Only an occasional domestic job is coming, and as a rule these do not involve very large quantities of steel. Nearly all the new work being taken by the fabricators is coming from the Government on direct and indirect orders. It is said the American Bridge Co. has taken 6000 tons for a Government explosive plant at Nashville, Tenn. The McClintic-Marshall Co. has taken 800 tons for a Government chemical plant at Sautville, Va., 600 tons for a boat shop at the Philadelphia Navy Yard, also 500 tons for a new boiler house for the Republic Iron & Steel Co. at Youngstown, Ohio. Deliveries of plain material by the mills to the fabricators are reported slightly better.

Plates.—At this writing (Tuesday evening) nothing has been heard from the Government on its prospective order for cars, but information is that the order is to be given out from Washington. It is said the initial order will be for 50,000 wooden box cars, and 50,000 70-ton steel hoppers, but this is not definite. It is still claimed there is a surplus in supply of ordinary plates, but that this is not the case in ship plates. It is known that three or four of the smaller plate mills not actively engaged in Government work are quoting on fairly large lots of plates, and for fairly prompt delivery. We quote ¼-in. and heavier sheared plates at 3.25c. at mill.

Tin Plate.—The average rate of operation among the tin plate mills this week will be slightly above 90 per cent, and this is considered a remarkably good record in view of the shortage in steel and also the shortage in common labor around the tin mills, which seems to be getting more acute. The heavy stocks of tin plate piled in mill warehouses were reduced during the months of March more than 800,000 boxes and will be still further heavily reduced during April. There is still a great shortage in supply of box cars and also in common labor used for loading. Recently tin mills have had to requisition other tin mill labor to load cars and at considerable expense. Output of tin plate in the first half of last week fell off a good deal owing to the Easter holiday, many men not reporting for work until the middle of the week. We quote tin plate at $7.75 per base box, rolled from Bessemer or open-hearth stock. Prices on terne plate are given on page 975.

Sheets.—The average rates of operations among the sheet mills is only about 60 per cent, this being due partly to the shortage in steel and more largely because of the fact that some concerns having both sheet and tin mills are neglecting the sheet mill end to some extent in order to spend output of tin plate. While the Government has not definitely placed its order for 50,000 tons or more of No. 24 gage, painted corrugated sheets to be used in building hangars and other small steel structures in France, it is said this will be done within the next few days. It is expected that close to one-half of the order will be taken by leading interests. The Government is also expecting to place other heavy orders for black and painted corrugated sheets in the near future, including a considerable quantity of 12 and 14 gage corrugated sheets to be used in Government buildings to be erected in France. The current demand for sheets from the general trade is quiet, but the mills are sold up largely over second quarter and some for a longer period. Government prices on sheets in effect for second quarter are given on page 975.

Iron and Steel Bars.—We note a continued active demand for both iron and steel bars and it is said that practically the entire output of the Carnegie Steel Co., on steel bars is going to the Government on direct or indirect orders. Large consumers are specifying against contracts for bars freely and local mills are sold ahead for some months, some of the larger producers of steel bars for practically the entire year. Government prices for second quarter are as follows: Steel bars rolled from steel billets, 2.90c.; from old steel rails 3c., and refined iron bars 3.50c. in carloads, f.o.b., Pittsburgh.

Wire Rods.—An inquiry is in this market for 2000 tons of soft basic rods for export, but two local makers say they have declined to quote, as they do not have the rods to spare. The general demand for soft rods is only fair, reflecting the quiet condition in the wire trade, but new demand for special rods is active. The consumption of high-carbon rods in the past year or more has been much heavier than usual, this being due largely to Government work of various kinds. One local maker has been furnishing for some time, large quantities of special rods to Eastern concerns and that is going into Government work almost entirely. Prices on rods are given in detail on page 975.

Wire Products.—As noted last week, the order for

30,000 kegs of wire nails for the Army, placed through the Corps of Engineers for shipment to France, was divided equally among three mills, these being American Steel & Wire Co., Jones & Laughlin Steel Co., and Pittsburgh Steel Co. The pending order for 40,000 kegs of wire nails by the Navy has not been placed and will probably amount to very close to 45,000 kegs. It is expected the order will be distributed among five or six of the mills within a very short time. The Government is in the market for 60,000 tons of barbed wire for shipment to Italy, and for delivery over the remainder of this year. The mills have quoted on this inquiry, stating how much of it they can take care of, and have quoted the regular price, but several mills have quoted an extra of 20c., which means that this barbed wire is to be painted gray, partly for the purpose of making it invisible to the enemy and also for the reason that the men handling it on the battlefields very often have their hands torn and if the wire is painted, it removes, to some extent, the danger of infection from such wounds. Formerly the gray paint used in painting this wire could be had for about 40c. per gallon, but now it is said to cost 90c. per gallon. There is a good deal of demand for barbed wire from the agricultural trade in the Northwest and the demand from the general trade for wire and wire nails is fairly active. So far, local mills have been able to secure all the business in wire and wire nails that they can take care of and make the deliveries wanted and state they have not found it necessary to shade prices and have not done so. Local mills are sold up to July or longer on about all the wire products they can turn out. Prices in effect on wire products for second quarter are given on page 975.

Cold-Rolled Strip Steel.—Makers continue to report that the demand from the general trade is light, as it has been for some months. The Government is still a fairly heavy buyer of cold-rolled strip steel, much of it for delivery to France, where so much new construction work is under way. Output of cold-rolled strip steel is not over 50 to 60 per cent of normal, due to shortage in steel and also because of large stocks still piled in mill warehouses. It is stated that prices fixed by the Government on cold-rolled strip steel are being firmly held.

We quote cold-rolled strip steel at $6.50 per 100 lb., f.o.b. Pittsburgh, terms 30 days, less 2 per cent cash in 10 days, when sold in quantities of 300 lb. or more.

Hot-Rolled Strip Steel.—The new demand is only fairly active, due to the falling off in business in cold-rolled strip steel. It is said the present output of hot-rolled strip steel is not more than 50 per cent of normal and it may be less. The Government maximum price is $4.50 per 100 lb., f.o.b. Pittsburgh, for second quarter, but this price is not firmly held.

Nuts and Bolts.—Buying by the general trade is very light, but some heavy inquiries from the Government are now being figured on by the makers. One inquiry is for about 10,000,000 bolts and nuts to be used by the Government in the building of hangars and other small steel structures in France, and another inquiry involves 6,000,000, part or all of which has been placed. A meeting of the Institute of Nut, Bolt and Rivet Manufacturers was held in New York last week, and there was a full discussion as to the means by which the makers can best serve the Government in its present great crisis. Makers of nuts and bolts are not operating to more than 50 to 60 per cent of capacity, due to shortage in steel and labor, and also because of falling off in orders. Government discounts on nuts and bolts in effect for second quarter, which are being shaded, are given on page 975.

Rivets.—The demand from the general trade is dull and orders from the Government have fallen off a good deal lately. None of the makers of rivets is operating to more than about 50 per cent of capacity. Government prices for second quarter are $4.65 for structural rivets and $4.75 for cone-head boiler rivets, per 100 lb. f.o.b. Pittsburgh.

Spikes.—The demand for small spikes on Government direct and indirect orders is extremely heavy and makers are sold ahead for four to six months. Very little is being done in railroad spikes. Prices as fixed by the Government in effect for second quarter are as follows:

Standard sizes of railroad spikes 9/16 x 4½ in. and larger, $3.90 per 100 lb. in lots of 200 kegs of 200 lb. each, or in larger lots. Boat spikes, $5.25 per 100 lb.; track bolts, $4.90 base in lots of 200 kegs or more; less than 200 keg lots, +1 per 100 lb. extra. All f.o.b. Pittsburgh.

Shafting.—The demand for shafting from the general trade is reported to be slightly better, but 75 per cent or more of the new business being taken is coming from the Government on direct or indirect orders. The large stocks of shafting piled in mill warehouses are slowly being reduced, as the supply of cars becomes better. We quote cold-rolled shafting at 17 per cent off list in carloads and 12 per cent in less than carloads, f.o.b. Pittsburgh.

Wrought Pipe.—Small orders for iron and steel tubular goods are being placed by the Government every few days, part of the business being for shipment to France, and in the aggregate these orders amount to considerable tonnage. The mills are still given priority in rolling and shipping on all Government orders, as they have done since the war started. The demand from the general trade for iron and steel pipe is only fair, but the mills are filled up so far ahead that they are not actively seeking business for delivery before late this year. Some large projects are under way by oil and gas companies, but when the question of getting the pipe is put up to the mills the invariable answer is that none of the mills can take on any large contracts for line pipe and make the delivery in time so that the lines can be laid this year. The high prices ruling for crude oil have stimulated new development in many fields, but oil producers are handicapped in the drilling of new wells by the great scarcity in supply of oil country goods, delivery on which it is almost impossible to obtain. Several of the larger steel pipe mills report that their entire output of welded pipe is under contract for all of this year. Discounts on iron and steel pipe, and which it is said are very firmly held, in effect for second quarter, are given on page 975.

Boiler Tubes.—The mills rolling iron and steel tubes, also seamless steel tubing, report that they have no material to spare for delivery this year. On boiler tubes and seamless steel tubing several of the larger mills have their product well sold up into the first half of next year. Jobbers who have any tubes in stock are able to get very much higher prices for them than are being named by the mills. Discounts on iron and steel tubes, in effect for second quarter, are given on page 975.

Skelp.—The great activity in the pipe and tube market is reflected in the heavy demand for both iron and steel skelp, which has been much heavier for some months than the makers have been able to supply. The few mills rolling skelp for the open market report they have their product sold ahead for some months and are much behind in deliveries on contracts. Prices are very firm and it is not a question of prices on skelp, but simply one of inability to get the material.

We quote grooved skelp at $2.90; universal skelp, $3.15, and sheared skelp, $3.25 base. Special skelp for boiler tubes, etc., is $3.40 for base sizes and $3.55 for other sizes, all prices being per 100 lb., f.o.b. Pittsburgh.

Coke.—Semi-official figures have been printed showing that the output of coke in the Connellsville region for the first quarter of 1918 showed a decrease over the first quarter of 1917 of 662,774 tons. The great decrease in output of coke in the Connellsville region occurred in January and in the first two weeks of February, due largely to the cold weather and inability to make shipments during the six weeks' period named. However, the output of coke in March was nearly as large as January and February combined, and it seems certain that the output for second quarter will be very much heavier than in first quarter. Coke producers report that the supply of cars is steadily getting better, but is not yet up to normal, and some plants are still running only there or four days per week, being unable to get enough cars to allow them to run full. In the past week a limited amount of free coke was made in

the Connellsville region, but this was sold very promptly and at regular prices. None of the blast furnace companies is making contracts for coke, but is simply taking in coke as fast as it can be shipped by their regular sources of supply and paying regular official prices for it. These prices are $6 for 48-hr. blast furnace coke, $7 for 72-hr. foundry coke, and $7.30 for crushed coke from 1-in. size, all in net tons at oven. The Connellsville *Courier* gives the output of coke in the Upper and Lower Connellsville regions for week ending March 30 as 352,435 tons, an increase over the previous week of 12,855 tons. There is considerable demand for foundry coke and some foundries are restricted in operations, owing to their inability to get delivery of coke as fast as needed.

Old Material.—As yet no official action has been taken by the War Industries Board at Washington looking to the relief of the scrap trade, but it is believed that before long a ruling will come from Washington allowing consumers who desire to do so to pay dealers the much talked of 3½ per cent commission for securing scrap for them. Local dealers say there is no chance for them to do business, as they cannot buy old material of any kind at less than Government fixed prices, nor can they obtain more than these prices from consumers. Very strong evidence is being placed before the War Industries Board showing that consumers are willing to pay reliable dealers 3½ per cent commission on purchases of scrap, but until a ruling comes from the board consumers are restrained from paying this commission. It is said there is less trouble in getting shipping permits from the railroads, but this does not avail the dealer very much, as he is in the position of being unable to make any profit on scrap deals he may put through. The fact that consumers are allowed to pay a freight differential, but only in a few cases, does not help the dealer. It is still impossible for local dealers to buy scrap in any of the leading scrap-producing centers and bring the scrap to the Pittsburgh district and sell it at a profit. Dealers still have considerable business on their books taken three or four months ago on which they are making the best deliveries they can, but they report new business is practically dead. A few small sales of heavy steel scrap, low phosphorus melting stock, and borings and turnings have been made recently at regular prices.

Prices on iron and steel scrap, effective from April 1, nearly all of which have been fixed by the Government, for delivery in Pittsburgh and other points that take Pittsburgh freight, are as follows:

Heavy steel melting scrap, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh, delivered	$28.50 to $29.00
No. 1 cast (for steel plants)	29.00
Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., Franklin, Pa., and Pittsburgh	33.50 to 34.00
Hydraulic compressed sheet scrap	24.00 to 25.00
Bundled sheet scrap, slides and ends, f.o.b. consumers' mill, Pittsburgh district	23.00 to 24.00
Bundled sheet stamping scrap	21.00 to 22.00
No. 1 railroad malleable stock	28.00 to 29.00
Railroad grate bars	18.00 to 19.00
Low phosphorus melting stock	38.00 to 39.00
Iron car axles	46.00 to 46.50
Steel car axles	46.00 to 46.50
Locomotive axles, steel	46.00 to 46.50
No. 1 busheling scrap	26.00 to 27.00
Machine shop turnings	18.50 to 19.00
Cast iron wheels	28.00 to 29.00
Rolled steel wheels	34.00 to 36.00
*Sheet bar crop ends	38.00 to 39.00
Cast iron borings	18.50 to 19.00
No. 1 railroad wrought scrap	33.00 to 34.00
Heavy steel axle turnings	23.00 to 24.00
Heavy breakable cast scrap	28.00 to 29.00

*Shipping point.

Chicago

CHICAGO, April 8—(*By Wire*).

The concentration of power with regard to Government requirements in the hands of B. M. Baruch will not be unwelcome to most steel men if it results in the sending of reports on capacity and mill conditions to one responsible head or bureau, eliminates the filing of orders which conflict with each other, thereby complicating rolling schedules, and leaves the steel men free to go ahead and make steel under intelligent direction as to what forms they should produce and where delivery should be made. Heretofore requests for reports have been numerous, inevitably following the evolution of some new bureau or official, and often coming from persons whose authority was not altogether convincing. Locally new developments are few, but production is going ahead at a rate that hardly could be bettered.

It is reported that the British Government has announced new requirements of ship and shell steel. The United States Government is investigating the possibility of having shapes rolled west of Chicago, and in this connection it is reported that a Pacific Coast mill has already enlarged its capacity in this respect. Great as is the production of the leading interest in this district, ranging above 90 per cent, it is not equal to specifications and orders. Car makers are figuring on the Government's requirement of freight cars, and there should be action soon. The proposed reduction in manganese content in standard ferromanganese and spiegeleisen would really amount to an advance in price, in view of there being an extra charge for each additional unit. The pig iron and old material markets are extremely quiet.

Pig Iron—Transactions are confined to small, miscellaneous lots, which occasionally turn up here and there, and the market in general presents an uninteresting aspect. With the furnaces so well sold ahead, it follows that consumers are well supplied. It does not appear that any are suffering. The leading Southern foundry iron producer continues to sell iron 1.75 to 2.25 per cent silicon for the last half, having gone as far as it desires at this time with high silicons. The Northern makers are principally engaged in explaining to consumers outside of this territory that they have no iron to spare. The scarcity of malleable is unquestioned, but some relief in this direction may come through the substitution of steel castings for malleable. Producers of iron in general have made their allotments and are now resting. In the South the car shortage is a growing menace to deliveries by reason of the Government policy of sending empties westward. In hope of obtaining some relief an appeal is being made to the Government inasmuch as much of the iron held up is wanted by Government work.

The following quotations are for iron delivered at consumers' yards, except those for Northern foundry, malleable Bessemer and basic irons, which are f.o.b. furnace, and do not include a switching charge averaging 50c. per ton:

Lake Superior charcoal, Nos. 2 to 5	$37.50
Lake Superior charcoal, No. 6 and Scotch	40.00
Northern coke foundry, No. 1	33.50
Northern coke foundry, No. 2	33.00
Northern coke foundry, No. 3	32.50
Northern high-phosphorus foundry	33.00
Southern coke No. 1 foundry and No. 1 soft	38.50
Southern coke No. 2 foundry	37.00
Malleable	33.50
Basic	32.00
Low phosphorus (copper free)	53.00
Silvery, 7 per cent	44.54

Ferroalloys—A prominent seller of standard ferromanganese has none to offer this side of July. Most interesting is the expected change in percentages of manganese in standard ferromanganese and spiegeleisen. The new standard for ferromanganese will be 68 to 72 per cent, 10 units less than formerly. The quotation on the new basis is $250, with an extra charge of $4 for each additional unit of manganese over 70, which makes 80 per cent alloy $290 per ton, with freight allowed to the Middle West. Makers have the option of shipping percentages higher than 70. Spiegeleisen is quoted at $70 furnace for 16 to 18 per cent, the new standard, although a recent sale was made at that price delivered. If a purchaser demands 18 to 22 per cent manganese in speigeleisen, the maker will ship it, if possible, but will base the price at $70 for 16 per cent and add $3.50 for each unit of manganese. The change amounts to an advance in price.

Plates—Government requirements absorb practically all of the local production, although a few narrow plates might possibly be obtained from mills further east. Universal plates are expected to help solve the

problem of material for the Government freight cars. The mill quotation is 3.25c., Pittsburgh or Chicago, with jobbers quoting 4.45c. for plates out of stock.

Structural Material—Car makers have the Government specifications in hand and probably will submit their bids this week. The Government is investigating the matter of obtaining shapes in the Far West. A Pacific Coast mill is reported to have already acquired rolls which will enable it to do larger work than has been its practice. Locally the mills have no shapes to spare, but the situation with regard to them is not so tight as in plates. The Illinois Steel Bridge Co. will fabricate five 200-ft. spans required for a bridge at Clarksfork, Idaho, this being the only fabricating job reported. The mill quotation is 3c., Chicago or Pittsburgh, and that of jobbers for material out of warehouse, 4.20c.

Bars—Activity is confined to concrete reinforcing and iron bars, for both of which the demand is fairly good. Rerolling rails continue scarce, though an occasional lot turns up. The most fortunate of makers are those who have discard shell steel to roll. A little business has been done in mild steel bars, but most of the makers are out of the market. Bars of discard shell steel are quoted at 3.02½c. We quote mild steel bars at 2.90c., Chicago or Pittsburgh; bar iron at 3.50c., and rail carbon bars at 3c., Chicago. Jobbers quote:

Soft steel bars, 4.10c.; bar iron, 4.10c.; reinforcing bars, 4.10c., base, with 5c. extra for twisting sizes ½ in. and over and usual card extras for smaller sizes; shafting, list plus 10 per cent.

Sheets—An Ohio mill has been taking orders against a limited quantity of one-pass cold-rolled black sheets, but is about through. A local maker has supplied old customers with about half the quantities they sought, delivery to be in the second and third quarters. Meanwhile the domestic demand is strong. While the Government wants considerable quantities, some delay is experienced in getting exact Government specifications on some requirements. We quote No. 10 blue annealed at 4.25c., No. 28 black at 5c., and No. 28 galvanized at 6.25c., all Pittsburgh.

We quote for Chicago delivery out of stock, regardless of quantity, as follows: No. 10 blue annealed, 5.45c.; No. 28 black, 6.45c., and No. 28 galvanized, 7.70c.

Wire Products—The chief feature is that production is forging ahead in point of volume and exceeds shipments. The demand is good from all directions, despite the absence of new building construction, although the call for fencing is subsiding. We quote:

Nails, $3.50, Pittsburgh; plain fence wire, $3.25; painted barb wire, $3.65; galvanized barb wire, $4.35; polished staples, $3.65, and galvanized staples, $4.35.

Bolts and Nuts—It is expected that revised prices will be announced this week. Meanwhile stocks are getting low. It is noticeable that orders, while numerous, are small, evidencing caution on the part of buyers. Production is going on at a record pace. For prices and freight rates, see finished iron and steel, f.o.b. Pittsburgh, page 975. Jobbers quote:

Structural rivets, 5.50c.; boiler rivets, 5.60c.; machine bolts up to ⅞ x 4 in., 40 and 10 per cent off; larger sizes, 35 and 5 off; carriage bolts up to ⅞ x 6 in., 40 and 2½ off; larger sizes, 30 and 5 off; hot pressed nuts, square tapped, $1.05 off, and hexagon tapped, 85c. off per 100 lb.; coach or lag screws, gimlet points, square heads, 50 per cent off.

Cast-Iron Pipe—Two to three lettings are pending, but no new propositions are announced.

Quotations per net ton, Chicago, are as follows: Water pipe, 4-in., $57.30; 6-in. and larger, $54.30, with $1 extra for Class A water pipe and gas pipe.

Rails and Track Supplies—Nothing of interest is reported, all being in the hands of the Government. We quote:

Standard railroad spikes, 4.11½c., Chicago. Track bolts, with square nuts, 5.11½c., Chicago. Tie plates, steel, 3.25c.; tie plates, iron, 3.75c., f.o.b. maker's mill. The base for light rails is 3c., f.o.b. maker's mill for 25 to 45-lb. sections, lighter sections taking Government extras.

Old Material.—The market is quiet and softer, although the leading local independent steel company has been a purchaser of heavy melting and shoveling steel. Uncertainty seems to have taken the life out of the market, so far as the collectors and dealers are concerned. Some of them appear to be realizing on their stocks, getting the best figure they can under the onerous restrictions which bind them, but they are not eager to re-invest their capital as they do not see a return sufficient to justify the employment of their money. Lists of moderate size have been issued by the Santa Fe, Pere Marquette, Union Pacific and Northern Pacific. No. 1 cast for steel plant use, under the Government rule cannot be bought or sold over the allowance maximum of $29 per gross ton, f.o.b., consumers' works, but none is going to steel works in view of the higher price obtainable for cupola use. The maximum for cast iron scrap for the foundry is $34, with the market around $27 per net ton or $30.24 per gross ton. Car wheels for steel mill use have a maximum of $29, also, the maximum for broken car wheels being $34. None is being sold at the lower figure.

We quote for delivery in buyers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Old iron rails	$38.00 to $39.00
Relaying rails	60.00
Old carwheels	29.00
Old steel rails, rerolling	33.00 to 34.00
Old steel rails, less than 3 ft	34.00
Heavy melting steel	29.00
Frogs, switches and guards, cut apart	29.00
Shoveling steel	28.00 to 28.50
Steel axle turnings	23.50
Per Net Ton	
Iron angles and splice bars	$34.21
Iron arch bars and transoms	39.50 to 40.50
Steel angle bars	30.00 to 31.00
Iron car axles	41.52
Steel car axles	41.52
No. 1 railroad wrought	30.36
No. 2 railroad wrought	28.96
Cut forge	28.96
Pipes and flues	23.00 to 23.50
No. 1 busheling	25.50 to 26.00
No. 2 busheling	17.75 to 18.25
Steel knuckles and couplers	30.36
Coil springs	30.36
No. 1 boilers, cut to sheets and rings	21.00 to 22.00
Boiler punchings	32.00 to 33.00
Locomotive tires, smooth	38.50 to 39.50
Machine-shop turnings	16.00 to 16.50
Cast borings	16.00 to 16.75
No. 1 cast scrap	27.00 to 27.50
Stove plate and light cast scrap	22.50 to 23.00
Grate bars	22.00 to 23.00
Brake shoes	24.00 to 25.00
Railroad malleable	28.25 to 28.75
Agricultural malleable	27.50 to 28.50
Country mixed scrap	19.50 to 20.00

Philadelphia

PHILADELPHIA, April 9.

Production of steel at eastern Pennsylvania plants continues to show improvement, but shipments, except for the Government, are being made with great difficulty. A large Eastern plant is now rolling only those orders for which it has permits to ship. The Pennsylvania Railroad is still seriously congested and Pittsburgh and Youngstown mills are particularly hampered in making shipments East. Plate mills are being speeded up by the Government to greater production. Producers are required to give weekly statements of their shipments, with names of consignees and the character of the work they are doing. In this way the Government expects to divert to shipyards all plates not urgently required for other war work.

Pig Iron.—Despite the belief in some quarters that the supply of pig iron will continue to improve upon the more favorable production statistics for March, the War Industries Board, according to pig iron men here, is concerned over the present acute shortage of iron, and there is considerable talk to the effect that iron shipments may soon be placed on a permit basis. This would amount to Government allocation of all iron, a process that has been effective for some months on low phosphorus grades. It is unofficially reported that the Government has ordered an additional 100 cars of coke daily to be shipped to help out the Eastern furnaces, some of which are still suffering severely from lack of supply. A number of merchant furnaces are still banked. Two Lehigh Valley companies, which have been hardest hit, will probably be first to receive the benefit of the larger coke supply. Shipments of iron are

being made with difficulty and even when iron has been made by a furnace and is ready for shipment, it is not always possible for a consumer to obtain railroad right-of-way. If the consumer's work is important in the prosecution of the war, the difficulties may be removed, but not without considerable red tape. A peculiar misunderstanding seems to have arisen in the minds of many consumers regarding the recent price announcement, reducing basic iron to $32 and Bessemer to $35.20. Pig iron sellers have received numerous inquiries as to whether this change also affects charcoal iron, malleable and other grades. The base price of iron still remains $33, and all differentials are figured from that point regardless of the reduction in basic. It was understood by iron producers that the prices of other grades of iron would not be disturbed, and the President's announcement was thought to have indicated this with sufficient clearness. Certain blast furnace interests are appealing to the War Industries Board to issue an order permitting consumers of iron to pay a commission to selling firms. For a number of months after the fixed prices went into effect, commissions were charged by some merchants, but the War Industries Board ruled that this was a violation of the Government maximum prices. Many furnaces have contracts with selling agents which provide for fixed commissions, but their contention is that, under present circumstances, the middleman's function is more to buy iron than to sell it. A meeting of Eastern pig iron distributers will be held at the Manufacturers' Club, Philadelphia, on Tuesday, April 16, at which this question will be discussed, and plans will be made for the formation of an association. Sales of iron during the past week have been exceedingly light, except that one interest has taken on a considerable tonnage of foundry iron for second half delivery, but several clauses have been inserted in the contracts which make the sales little more than options. The contracts stipulate that the price at time of delivery shall be the Government schedule, but that either party has the right of cancellation if the Government price is not satisfactory. The sales are also subject to the ability of the company to produce its expected quota of iron, and if only partial output is maintained, the iron made will be pro-rated. We quote standard grades of iron, f.o.b., furnace, except Virginia iron, for which the delivered prices are quoted:

Eastern Pennsylvania No. 1 X	$34.50
Eastern Pennsylvania No. 2 X	33.50
Eastern Pennsylvania No. 2 foundry	33.00
Virginia No. 2 X (including freight)	36.77
Virginia No. 2 foundry (including freight)	36.27
Basic	32.00
Gray forge	32.00
Bessemer	35.20
Standard low phosphorus	53.00
Low phosphorus (copper bearing)	50.00

Coke.—There is no great improvement in the coke situation, though furnace interests which have suffered from lack of sufficient supply get some encouragement from the reported action of the Government in allocating 100 cars of coke daily to Eastern furnaces, in addition to that already coming to this district. The Pennsylvania Railroad has issued orders that all coke cars bear the word coke in large letters so that they may be easily spotted and routed back to the ovens. The principal complaint which reaches local coke sellers from the Connellsville regions is that empty cars are not returned as speedily as they should be. We quote 48-hr. blast furnace coke at $6, and 72-hr. foundry coke at $7, with no spot coke to be had.

Ferroalloys.—A leading producer continues to offer 70 per cent ferromanganese at $250, delivered, for first half, with $4 per unit extra for the 78 to 82 per cent. Another seller offers the 80 per cent at $275, delivered, for first half. These prices are likely to change at any time. Spiegeleisen, 16 per cent, is being quoted at $70, furnace, and 18 to 22 per cent at $75, furnace, but either grade is hard to get for prompt delivery. A meeting of ferroalloy producers will be held in New York on Thursday.

Billets.—Production of open-hearth rerolling billets for delivery on contracts may be interfered with at one or two mills by the Government's insistent demands for plates for shipbuilding. A nearby mill was last week urged to concentrate all of its efforts on plate production, and this necessarily would curtail the quantities of billets available for shipment, as its production of ingots is not 100 per cent. We quote open-hearth rerolling billets at $50.50, Philadelphia.

Sheets.—A large producer with sales office here has withdrawn from the market for second quarter, and is not yet ready to sell for third quarter. Shipments of sheets from the Pittsburgh and Youngstown mills are infrequent except for Government work on account of the railroad situation. A local company came into the market this week for several thousand tons of 1-8 in. sheets for the manufacture of covers for trenches. High carbon sheets are available for this quarter. We quote No. 10 blue annealed sheets at 4.25c.; No. 28 black at 5c., and No. 28 galvanized at 6.25c., all Pittsburgh.

Plates.—Government effort is centered on obtaining the largest possible production of plates for shipbuilding. Mills are required to furnish weekly statements of their shipments for other than Government work, giving the names of consignees and the character of the work they are doing. Some companies are shipping every pound of plates they roll suitable for shipbuilding to the Navy Department or to the shipyards of the Emergency Fleet Corporation. The Director of Steel Supply has in some instances urged that production of other rolled products be curtailed in favor of plates; in other words, that plate mills be operated at maximum capacity regardless of whether sufficient steel is left for the operation of other departments. A Pittsburgh company has notified its sales office here that its Government orders for all hot-rolled products, but particularly plates, for second half are already so heavy that it is undesirable at this time to make any commitments to the commercial trade for that position. An example of the urgency of the need of plates is afforded by the fact that the War Industries Board has speeded up completion of the new plant of the Worth Steel Co., at Claymont, Del., and it now appears certain that this plant will make steel and roll plates, beginning in June. In addition to the needs for shipbuilding, the car-building and locomotive-building requirements are receiving attention in Washington. Car builders again visited Washington to-day (Tuesday) to complete some of the arrangements preliminary to the letting of orders for 100,000 cars. It is now stated positively that the number of locomotives ordered will be 3000, divided as follows: Baldwin Locomotive Works, 1200; American Locomotive Co., 1200; Lima Locomotive Corporation, 600. Plates have been ordered shipped to a local fabricating plant, which is at work on steel structures on which heavy guns are to be mounted for use in France. These steel frameworks will be attached to cars, which are being built in a Philadelphia plant. Information received by steel companies regarding the ship negotiations between this country and Japan is that the United States will ship at once 100,000 tons or plates at the high prices at which this material was bought last year and 100,000 tons of new production at 3.25c. It is estimated that Japanese interests have on order in this country about 400,000 tons of plates. We quote plates at 3.25c., Pittsburgh.

Structural Material.—The market is quiet so far as building projects are concerned. Large orders are being received for ship work, and the Government is urging speeding up of deliveries, though the shortage of shapes for ship work does not appear to be as acute as that in plates. We quote plain material at 3c., Pittsburgh.

Iron and Steel Bars.—Very little business is being done in steel bars, except concrete reinforcing bars, for which there is a fair demand and a sufficient supply. Bar iron business is light. There are reports of shading of the Government price, but these are not confirmed. We quote soft steel bars at 2.90c., Pittsburgh, and bar iron at 3.685c., Philadelphia.

Cast Iron Pipe.—A better business in cast iron pipe is in prospect, as is to be expected in the spring. Housing developments of the Government at shipyards and munition plants will require considerable tonnages. There is a fair demand from the South. The Metro-

politan Water District of Boston has not yet advertised for bids, but is expected to do so soon. It will require 1000 tons. Buffalo will advertise May 1 for 2000 tons of 36-in. pipe. Government prices are as follows: $53.85, Philadelphia, for 6 in. and heavier, and $56.85 for 4 in.; $63.85 for 3 in. and $1 additional for Class A and gas pipe.

Old Material.—Petitions have been signed by many consumers of scrap in this district asking the War Industries Board to grant to scrap dealers the right to charge a commission for their services in purchasing iron and steel scrap. These petitions, together with those obtained through divisions of the American Board of Scrap Dealers in other districts, will be first shown to the Committee on Steel and Steel Products of the American Iron and Steel Institute and probably next week will receive the attention of the War Industries Board. Until the question of the commission is settled, business in this market will remain at low ebb. Mills are willing to buy, but dealers do not wish to sell without the commission. In a few instances sales have been made subject to the payment of the commission should it be allowed. Scrap dealers having orders are finding it difficult to purchase scrap to fill these orders, as every owner of scrap is apparently holding for the full Government price. The Sub-Committee on Iron and Steel Scrap of the American Iron and Steel Institute, whose chairman is W. Vernon Phillips, Pennsylvania Building, has received a few requests from consumers for permits to pay differentials in freight between their plants and more favorably located competitors. Shipments of scrap cannot be made without permits, and this adds greatly to the difficulty of doing a scrap business at the present time. Jacob Ginsburg, chairman of the transportation committee of the American Board of Scrap Dealers, Eastern Division, advises shippers of scrap that in applying to Assistant General Freight Agent Glynn of the Pennsylvania Railroad for shipping permits they should give the mailing address to which they desire the shipper's copy of permit to be sent. A number of such permits have been returned to the Pennsylvania Railroad undelivered because the shipper's copy of the permit has been sent to the city in which the material originates, where sometimes the shipper has no office. There is a great scarcity of old carwheels. Our quotation last week of No. 1 railroad wrought at $39 was a typographical error and should have read $34. We quote the following for delivery at consuming points in eastern Pennsylvania:

No. 1 heavy melting steel	$28.00 to $29.00
Steel rails, re-rolling	34.00
No. 1 low phosphorus heavy, 0.04 and under	39.00
Low phosphorus, 0.04 and under	36.50
Low phosphorus (not guaranteed)	32.00 to 34.00
Old iron rails	39.00
Old carwheels	29.00
No. 1 railroad wrought	34.00
No. 1 yard wrought	33.00
Country yard wrought	29.00
No. 1 forge fire	25.00 to 26.00
Bundled skeleton	25.00 to 26.00
No. 1 busheling	31.00
No. 2 busheling	17.00 to 18.00
Turnings (for blast furnace use)	17.50 to 18.00
Machine shop turnings (for rolling mill use)	18.50 to 19.00
Cast borings (for blast furnace use)	17.50 to 18.00
Cast borings (clean)	19.00
No. 1 cast (for steel plant use)	29.00
No. 1 cast (cupola sizes)	32.00 to 33.00
Grate bars	23.00 to 24.00
Stove plate	23.00 to 24.00
Railroad malleable (for steel plants)	28.00 to 29.00
Railroad malleable (for malleable works)	31.00 to 32.00
Wrought iron and soft steel pipes and tubes (new specifications)	32.00 to 33.00
Ungraded pipe	29.00

Cleveland

CLEVELAND, April 9.

Iron Ore.—Much inquiry for manganiferous ores from the Lake Superior district has sprung up during the past few days because of the plan of the Government to reduce the importation of manganese ore and to cause the utilization of domestic manganese ores to the greatest extent possible. Carrying charges on Lake Superior ore have been fixed at the same rate as last year and for the period from the opening of navigation up to June 30. These rates are $1 net from ports at the head of the Lakes, 90c. from Marquette, and 75c. from Escanaba to Lake Erie ports, and 60c. from Escanaba to South Chicago. A large amount of ore had previously been tied up on long-time contracts at the going rate. It is expected that the rates named will prevail throughout the entire season. The amount of ore on Lake Erie docks April 1 was 7,841,788 gross tons, as compared with 6,792,076 tons on the same day a year ago. March shipments from docks showed a decided gain over the previous month, amounting to 1,651,564 tons, against 555,852 tons in February. The total for March, 1917, was 1,658,586 tons. Shipments from docks from the opening of navigation in 1917 to April 1 this year were 1,693,822 tons less than during the same period of the preceding year, the total amount to April 1 being 38,236,583 tons as compared with 39,930,405 tons to April 1, 1917. We quote f.o.b. lower Lake ports:

Old range Bessemer, $5.95; old range non-Bessemer, $5.20; Mesaba Bessemer, $5.70; Mesaba non-Bessemer, $5.05.

Ferroalloys.—The demand for ferromanganese and spiegeleisen has been very active during the past few days and prices have advanced sharply. The demand appears to have been stimulated by the recommendation of the ferroalloys committee of the American Iron and Steel Institute made last week urging the use of domestic manganiferous ores and manganese ore to their maximum extent, and the manufacture of spiegeleisen and ferromanganese in order to reduce importations of manganese, and also recommending the reduction of the content from 80 to 70 per cent for standard ferromanganese, and from 20 to 16 per cent for spiegeleisen. Ferromanganese has advanced from $250 to $282 for 80 per cent for early shipment, at which price a number of sales have been made. For the last half, $282 is being quoted for 80 per cent and $250 for 70 per cent ferromanganese. Sales in this territory during the week include several 500-ton and some smaller lots. Spiegeleisen has advanced from $65 to $80, furnace, for delivery up to July 1, and sales have been made in lots of 300 to 700 tons.

Pig Iron.—The demand for foundry iron for the last half delivery is still very active, but there is very little to be had in this territory. Selling agencies are receiving numerous inquiries from outside of their respective territories, but naturally they are not giving these consideration, as they are able to supply only a portion of the tonnage required by their regular trade. The Standard Parts Co., Cleveland, has succeeded in securing 2000 tons of foundry iron inquired for last week for its Canton plant for Government work. Among new Government inquiries is one for 1000 tons of low phosphorus iron for the Watertown Arsenal for May-December delivery, and one from a Kalamazoo, Mich., plant for 700 tons of No. 2 foundry and 175 tons of silvery iron. A central Ohio steel plant is inquiring for 10,000 to 20,000 tons of basic iron for the last half. Several other basic inquiries are still unsatisfied. There is considerable inquiry for Southern iron from consumers who are unable to buy Northern grades, but very little Southern iron is available in this market.

Bessemer	$36.25
Basic	32.30
Northern No. 2 foundry	33.30
Southern No. 2 foundry	37.00
Gray forge	32.30
Ohio silvery, 8 per cent silicon	46.12
Standard low phosphorus, Valley furnace	50.00

Coke.—Plans are being worked out by the Fuel Administrator in Washington for supplying the entire foundry trade in Cleveland with coke from the by-product plant of the McKinney Steel Co. This company recently by direction of the Fuel Administrator diverted its surplus coke, which it had been shipping to its western Pensylvania blast furnaces, to the Cleveland furnaces of the American Steel & Wire Co., and its Pennsylvania plants are now being supplied by the H. C. Frick Coke Co. The American Steel & Wire Co. will place its Cleveland by-product coke plant in operation about June, and this will permit the diversion of the McKinney by-product coke to Cleveland foundries.

Finished Iron and Steel.—The demand in finished

lines is heavy, being largely for plates and sheets. The call for plates for Government work is so heavy that consumers not having class A priority orders are finding it almost impossible to place their tonnage. Many new plate inquiries are pending for material for submarine work, tank cars, boilers and various kinds of boat equipment. The demand for sheets is almost wholly for Government work and other consumers are finding it very difficult to place orders, particularly for black and blue annealed sheets. An Ohio stove company has placed about 1000 tons of blue and galvanized sheets for portable stoves for the Government, and is inquiring for 700 tons more. Another inquiry is for 600 tons of corrugated sheets for shelter houses. Some of the Ohio sheet mills are now accepting orders for Government work only. Implement manufacturers are crowding their plants to capacity to supply the heavy demand for their products and some of the mills are now covering these manufacturers with second quarter contracts for steel bars, their policy being to supply as well as they are able the demand of this essential industry. Bessemer bars in some sizes can be had for delivery in six to eight weeks. Many mills are trying to secure sheet bars, but without success, as the shortage continues acute. Following the wage advance made by the United States Steel Corporation the McKinney Steel Co. and the Upson Nut Co., Cleveland, will advance wages 15 per cent April 15, the Cleveland Furnace Co. will make some advance on that day, the Cleveland Steel Co. will advance wages May 1, and some of the other Cleveland mills will probably fall in line with advances.

Old Material.—There is little activity in the market. Heavy melting steel and low phosphorus melting scrap are in good demand, but dealers generally are making no efforts to deal in these grades because they cannot buy and sell at profit unless they are to be allowed commissions. Some dealers are willing to make deals with a commission clause in their contracts, so that they will collect commissions, if these should be allowed later. Some steel-making scrap is being sold directly by producers to consumers, but dealers are devoting their attention largely to specialties and grades that they are able to buy below the Government price. Cast scrap is weak and it is reported offered as low as $31, gross ton. Consumers are well supplied and dealers are having difficulty in moving this grade. Railroad grate bars and stove plate that were marked up when the new price on cast scrap was announced have declined sharply. Borings and turnings are plentiful and are hard to move. The market on these grades is weak, and dealers claim that they are making purchases as low as $18. Dealers quote, f.o.b., Cleveland, as follows:

Steel rails	$27.00 to $28.00
Steel rails, re-rolling	34.00
Steel rails, under 3 ft	34.50
Iron rails	39.00
Iron car axles	46.50
Steel car axles	46.50
Heavy melting steel	29.00
Cast borings	18.50 to 19.00
Iron and steel turnings and drillings	18.50 to 19.00
No. 1 railroad wrought	34.00
Hydraulic compressed steel scrap	28.00 to 29.00
Cast iron car wheels, unbroken	29.00
Cast iron car wheels, broken	34.00
Agricultural malleable	24.00 to 25.00
Railroad malleable	34.00
Steel axle turnings	24.00
Light bundled sheet scrap	24.50 to 25.00
Cast iron scrap	29.00
Cast iron scrap, broken to cupola size	31.00 to 32.00
No. 1 busheling	30.00 to 31.00
Per Net Ton	
Railroad grate bars	22.50 to 23.50
Stove plate	22.50 to 23.50

Bolts, Nuts and Rivets.—No definite action on bolt and nut prices for the second quarter has as yet been taken, but it is expected that the present prices will be reaffirmed within the next few days. The price situation was discussed at a meeting of the bolt and nut manufacturers held in New York last week, and a committee of which N. J. Clarke, of the Upson Nut Co., Cleveland, was chairman, was appointed to present the matter before the Steel and Steel Products Committee of the American Iron and Steel Institute. With the advance in wages and increasing scarcity of labor, most bolt and nut manufacturers see no reason for lower prices. Although the Government maximum prices were shaded some weeks ago on a Government inquiry, it is now claimed that practically all manufacturers are adhering to the regular schedule. The Government has come into the market with an inquiry for 129,000,000 bolts and nuts. This covers those needed in a recent inquiry for 55,000,000, on which specifications have been changed, and also large additional requirements. Rivet specifications from shipyards are very heavy, but new demand is limited to small lots.

Cincinnati

CINCINNATI, April 9—(*By Wire*).

Pig Iron.—The inquiry for foundry iron is not so heavy and sales for future shipment are also lighter. However, considerable low grade iron has been sold for second quarter shipment and for this delivery two nearby melters bought 500 tons each of No. 4 foundry, and smaller tonnages of No. 3 were also disposed of by some furnaces in the Birmingham district. Some foundry iron has also been bought for last half shipment, but the producers are indifferent about taking on any orders except from their old customers. Careful inquiry reveals that considerably more last half foundry iron can be sold in the South and in the Ironton district than has been estimated. If production is maintained at anything like full capacity, there will yet be considerable iron to offer later on. This does not apply to basic, which is scarce and in fact almost unobtainable. None can be had for nearby shipment and melters cannot now place any orders for future delivery. Malleable iron is also very scarce. Some confusion exists concerning a circulated report that the foundry irons were included with basic in the recent price reduction, but as no Ohio silvery has been sold lately, this has caused no serious trouble. Shipments from all districts are moving with more celerity, but the scarcity of cars in the South remains a serious problem.

Based on freight rates of $2.90 from Birmingham and $1.26 Ironton, we quote f.o.b. Cincinnati, as follows:

Southern coke, No. 2 foundry and No. 2 soft	$35.90
Southern Ohio, No. 2	34.26
Basic, Northern	33.26

Coke.—Consumers of foundry coke are getting supplies a little more promptly. The weather has enabled the railroads to move shipments more rapidly, but the same old complaint as to the short car supply is being made. Furnace coke is also going forward at a much better rate, with the movement from the Connellsville district showing considerable improvement in the past few days. New buying is scarce, although a few foundry contracts are being renewed. Coke for domestic purposes is in fairly good demand, but these purchases do not cover any large tonnages. Reports from both the Wise County and Pocahontas fields indicate that oven operators feel more encouraged over the future prospects of supplying their customers more promptly. However, a general increase in the output of coke will do no good, unless cars can be secured in which to forward the material.

Finished Material.—Reinforcing concrete rods have lately been in demand. Practically all buildings now contemplated are for additions to plants having war contracts. The inability to get structural shapes, as well as the high cost of this class of material, has caused building contractors to turn to concrete construction. Although Portland cement has been advanced considerably since the beginning of the war, it is proportionately not as high as present costs of structural steel. The shipping situation is greatly improved, and less than carload shipments to Dayton and other nearby points can be made now, whereas a week ago frequently shipments were refused by transportation lines after they had been delivered at the receiving depots. Jobbers' price on wire nails seems now to be around $4, although as high as $4.10 per keg base is the quotation of one large wholesale house. High-speed steel salesmen report a good demand from machine shops, and

shipments now are almost normal as far as the time en route is concerned.

Jobbers' prices are as follows: Iron and steel bars, 4.08½c.; twisted bars, 4.36½c. base; structural shapes, 4.18½c.; plates, ¼-in. and heavier, 4.43½c.; No. 10 blue annealed sheets, 5.43½c.; cold rolled shafting, 10 per cent plus list. The mill price on No. 28 black sheets remains at 5.18½c. and on No. 28 galvanized, 6.43½c. The warehouse price on wire nails is unchanged at $4 to $4.10 per keg base.

Fluorspar.—New business is very quiet, but there is a marked improvcment in the movement of fluorspar on former contracts. During a period of over two months none of the material could be moved, and the present open weather is welcomed especially by the furnaces which were running short of a supply. Prices on spot washed gravel fluorspar are far apart, and from $30 to $40 per ton at loading point is quoted. Contract figures are more in line and from $28 to $30 for the remainder of the year represents figures of producing firms. Desirable contracts would probably be made below $28 at shipping point.

Old Material.—The commission question is bothering local dealers. Some profess to be somewhat at sea as to the way in which the new ruling on the payment of freight differentials will be applied. A full explanation of this plan of assisting badly located plants to obtain scrap was published on page 891 of the April 4 issue of THE IRON AGE. Application for permits to pay freight differentials must be made by scrap consumers to W. Vernon Phillips, chairman of the sub-committee on iron and steel scrap of the American Iron and Steel Institute, Pennsylvania Building, Philadelphia. Prices locally are weaker. Shipments to the Pittsburgh district can now be made more easily and in many instances without the permits which have been required. The following are dealers' prices f.o.b. at yards, southern Ohio and Cincinnati:

Per Gross Ton

Bundled sheet scrap	$19.00
Old iron rails	$32.00 to 32.50
Relaying rails, 50 lb. and up	44.00 to 44.50
Rerolling steel rails	31.50 to 32.00
Heavy melting steel scrap	26.00 to 26.50
Steel rails for melting	26.00 to 26.50
Old carwheels	28.00

Per Net Ton

No. 1 railroad wrought	$28.50 to $29.00
Cast borings	13.00 to 13.50
Steel turnings	13.00 to 13.50
Railroad cast	25.00 to 25.50
No. 1 machinery	25.00 to 25.50
Burnt scrap	16.50 to 17.00
Iron axles	40.00 to 40.50
Locomotive tires (smooth inside)	33.50 to 34.00
Pipes and flues	20.00 to 20.50
Malleable cast	24.00 to 24.50
Railroad tank and sheet	17.00 to 17.50

Birmingham

BIRMINGHAM, ALA., April 8.

Pig Iron.—Southern iron masters are uniformly concerned with deliveries to the exclusion of almost everything else. There is a brisk inquiry, but little new business is taken on for fear of interfering with wants of regular customers. A Honolulu foundryman endeavored to place additional orders during the week without avail. The car shortage incident to the diversion of empties to the west for the grain movement became so acute that the Sloss-Sheffield, Republic, Woodward and other companies appealed to Washington and toward the close of the week received assurances of some relief in the immediate future. They allege a 50 per cent deficiency in car service. One minor interest, it is known, has in yards 30,000 tons which should have moved to consumers in March. The Alabama will blow in another stack at Gadsden soon; one stack at Gadsden and one at Ironaton are in operation and will remain so. Operations at Sheffield and Trussville still await sufficient assemblage of raw material. Indications point to a substantial increase in iron production in May, certainly in June. The feature of the week is the announcement by the Tennessee company that it will add 154 Koppers ovens with complete recovery plants to the 208-oven plant at Fairfield. Total expenditures of the Tennessee company on works under way and announced for early construction will approximate $30,000,000. The company is figuring very little in the general iron trade, its own wants taking care of the output. We quote per gross ton, f. o. b. Birmingham:

No. 2 foundry and soft $33.00

Cast Iron Pipe.—There was a slight improvement in the cast iron pipe business during the week, several orders for 6-inch and 12-inch pipe for Alabama mines and the Government having been awarded. The United States Cast Iron & Foundry Co.'s plant at Bessemer remains idle, but the Birmingham plant is on about half turn. Government orders for sanitary pipe for industrial points have also been received, but little is heard from the building trade at large.

Coal and Coke.—The coal situation has improved, but miners continue to prefer three to four days per week at maximum wages to five and six days. Definite announcement as to proposed utilization of the Warrior river as an emergency coal carrier is expected from Secretary McAdoo at an early date. The report has gone to him favorably. The new Government coke schedule fixes the price of Black Creek and Brookwood 72-hr. hand-picked coke at $8.75 compared with $8 in the February schedule. Local coke consumers have no difficulty in obtaining car supplies, but the outward movement is hampered. Pacific coast refineries and Texas points are taking large amounts of the Alabama product.

Old Material.—The scrap market remains steady. The supply might be larger, as this is the season of stocking up in consuming yards. A gradually decreasing supply of scrap is expected, but it not thought it will materialize to a marked extent until late autumn. We quote per gross ton f.o.b., Birmingham, district dealers' yards, as follows:

Old steel axles	$32.00 to $33.00
Old steel rails	27.50 to 28.00
Heavy melting steel	26.00 to 27.00
No. 1 railroad wrought	31.00 to 32.00
No. 1 cast	28.50 to 29.50
Old carwheels	25.00 to 30.00
Tramcar wheels	21.00 to 25.00
Machine shop turnings	15.00 to 16.00
Cast iron borings	15.00 to 16.00
Stove plate	23.50 to 24.50

St. Louis

ST. LOUIS, April 8.

Pig Iron.—While deliveries of pig iron are improving as a result of the better state of car service and the increased production of the furnaces, there has been very little change in the situation as regards purchases of pig iron by consumers, who are still unable to get what they want. Inquiries for Northern basic which have been in the market for some weeks have not been placed, about 20,000 tons being wanted for last half delivery. No calls for Southern basic remain unfilled at the present writing and no new inquiries therefor are looked for. Such transactions as have been closed during the week were for special lots of varied analyses, the excess of furnace runs and chiefly for spot delivery, being offered by furnaces and taken up quickly on presentation by melters.

Coke.—The melters are receiving their contract coke more regularly and in consequence are keeping their plants in a more smoothly operating state. No new business is appearing, however, the calls for spot deliveries of small lots to take the place of delayed shipments having largely disappeared from the market. No offerings of either by-product or bee hive coke are being made and the market is, therefore, in a very quiet condition. By-product plants shipping into this territory are still in a heavily sold up condition.

Finished Iron and Steel.—In finished products, the effort to place new contracts for forward delivery has practically ceased, the consumers having found that little material is available and they are generally awaiting the pleasure of the mills. For stock out of warehouse we quote as follows: Soft steel bars, 4.17c.; iron bars, 4.17c.; structural material, 4.27c.; tank plates, 4.52c.; No. 8 sheets, 5.47c.; No. 10 blue annealed sheets,

5.52c.; No. 28 black sheets, cold rolled, one pass, 6.52c.; No. 28 galvanized sheets, black sheet gauge, 7.77c.

Old Material.—Scrap dealers are still handling the market cautiously and no transactions of consequence have been reported during the past week, as the consumers are looking for a readjustment of figures as a result of the spring supplies of scrap which they expect to come from the railroads with the improvement of weather for picking up and the better traffic conditions. There is very little disposition among the dealers to trade among themselves and the new Government prices have increased the caution with which trading is carried on. There is a feeling, however, that the consuming interests are in need of material beyond what they have coming in under contracts and that there will be buying within a short time. In the mean time, they are occupying some of their time in discussing the heavy increases in assessments which are being made on yard stocks and their business operations by the tax board of equalization. The increases have been exceptionally heavy and have hit some of the dealers quite severely, though it is expected that the heavier levies will stand in view of the needs of the city and state. We quote dealers' prices, f.o.b., customers' works, St. Louis industrial district, as follows:

Per Gross Ton

Old iron rails	$35.00 to $35.50
Old steel rails, re-rolling	33.50 to 34.00
Old steel rails, less than 3 ft	36.50 to 37.50
Relaying rails, standard sections, subject to inspection	60.00 to 75.00
Old carwheels	28.50 to 29.00
No. 1 railroad heavy melting steel scrap	27.50 to 28.00
Heavy shoveling steel	27.50 to 28.00
Ordinary shoveling steel	26.00 to 26.50
Frogs, switches and guards cut apart	28.00 to 28.50
Ordinary bundled sheet scrap	22.00 to 22.50
Heavy axle and tire turnings	20.50 to 21.00

Per Net Ton

Iron angle bars	$34.50 to $35.00
Steel angle bars	28.00 to 28.50
Iron car axles	41.00 to 41.50
Steel car axles	40.00 to 40.50
Wrought arch bars and transoms	40.50 to 41.50
No. 1 railroad wrought	28.50 to 29.00
No. 2 railroad wrought	27.50 to 28.00
Railroad springs	28.50 to 29.00
Steel couplers and knuckles	29.75 to 30.25
Locomotive tires, 42 in. and over smooth inside	36.00 to 36.50
No. 1 dealers' forge	25.50 to 26.00
Cast iron borings	15.50 to 16.00
No. 1 busheling	24.00 to 24.50
No. 1 boilers, cut to sheets and rings	22.00 to 22.50
No. 1 railroad cast scrap	25.50 to 26.00
Stove plate and light cast scrap	20.00 to 20.50
Railroad malleable	25.50 to 26.00
Agricultural malleable	23.50 to 24.00
Pipes and flues	23.00 to 23.50
Heavy railroad sheet and tank scrap	21.50 to 22.00
Railroad grate bars	19.00 to 19.50
Machine shop turnings	15.75 to 16.25
Country mixed scrap	19.50 to 20.00
Uncut railroad mixed scrap	23.00 to 23.50

Buffalo

BUFFALO, April 8.

Pig Iron.—Furnaces are becoming more and more solidly sold up for the entire year of 1918, and the securing of a place on producers' books by consumers, even for small tonnages, is becoming increasingly difficult. Many foundries are obliged to operate on a reduced and hand-to-mouth basis on account of inability to obtain steady and adequate supply of iron on existing contracts, which in some instances are nearing completion, and the practicable impossibility of placing new orders. One of the largest producers of the district which has for a considerable period had two of its furnaces operating on basic which it delivers as hot metal to a nearby consumer is to change to foundry grades the latter part of the month; but even with this increase in foundry iron output in addition to that of the two furnaces regularly operating on foundry iron, its existing contracts for foundry grades will absorb practically all of its increased output of those grades to the end of the year. The shipping situation has again become complicated by the establishment of embargoes on railroads out of Buffalo to the East, with certain exceptions on materials for Government uses. There has been some betterment in car supply at furnaces, however, and there has been an improvement in the receipts of coke. Furnacemen are rushing production to the utmost. We continue last week's price schedule, which is as follows f.o.b. furnace Buffalo:

No. 1 foundry, 2.75 to 3.25 silicon	$34.50
No. 2 X, 2.25 to 2.75 silicon	33.50
No. 3 foundry, 1.75 to 2.25 silicon	32.50
Gray forge	32.00
Malleable	33.50
Basic	32.00
Lake Superior charcoal, regular grades, f.o.b. Buffalo	37.50

Old Material.—Demand is strong in most lines, particularly for heavy melting steel (in which there is still a pronounced shortage), car wheels and stove plate. The shortage in heavy melting is resulting in the increased use of bundled sheet scrap in its place by some consumers and in consequence of this substitution there has been an increase in price of the latter commodity of from $2 to $3 per ton, the price range for same now being $24 to $25 per ton instead of $21 to $23 last week. In the opinion of dealers, the shortage in heavy melting steel is likely to be more acute in the near future on account of the announced ruling which will allow users of this commodity in large consuming centers who obtain a permit from the chairman of the Sub-committee on Iron and Steel Scrap of the American Iron and Steel Institute to pay the regular price plus the freight differential. This may, temporarily, at least, take away some portion of heavy melting steel from the natural feeders of the Buffalo district and send it to the Pittsburgh district, where the demand just now is urgent. As Buffalo users may also obtain such permits, however, it is not anticipated that any large part of such scrap originating in this district will be drawn permanently away from its natural market. A scarcity in car wheels is noted and consumers say it is because they are broken up and sold under the classification of cast scrap, which commands $34 per ton as against the Government price of $29 per ton for old car wheels; the cost of breaking up the wheels being only 60 to 75 cents per ton. Increased demand for stove plate has put the price up to $25 to $26 per ton. The week has shown further improvement in the car supply situation. The price schedule is as follows, per gross ton, f.o.b. Buffalo:

Heavy melting steel	$29.00
No. 1 low phosphorus, heavy, 0.04 and under	39.00
Low phosphorus, 0.04 and under	36.50
Low phosphorus, not guaranteed	34.00
No. 1 railroad wrought	34.00
No. 1 railroad and machinery cast	34.00
Iron axles	$44.00 to 46.00
Steel axles	44.00 to 46.00
Carwheels	29.00
Railroad malleable	34.00
Machine shop turnings	17.00 to 17.50
Heavy axle turnings	24.00
Clean cast borings	18.00 to 19.00
Iron rails	24.00
Locomotive grate bars	24.00
Stove plate	24.00
Wrought pipe	27.00 to 28.00
No. 1 busheling scrap	29.00 to 30.00
No. 2 busheling scrap	21.00 to 23.00
Bundled sheet stamping scrap	21.00 to 23.00

Finished Iron and Steel.—The inquiry for bars, structural shapes and plates has been large during the week, a considerable proportion being for Government work. One inquiry was noted for 1,000 tons of bars and there is renewed interest in reinforcing bars with increasing volume of inquiry. The demand for cold finished steel has been quite heavy and there is a growing scarcity of sizes over 2 in., the demand for transmission purposes, as well as machine tool parts, being exceptional. It also develops that the farm tractor manufacturers are requiring a considerable tonnage of large rounds. Buyers are finding it increasingly difficult to obtain the larger sizes, 3 in. and over, and some users are in consequence forced to the necessity of buying forged bars and turning them to the required size. There has been some inquiry for tin plate for shipment over the last half of the year, but mills are refraining from taking on last half tonnage because prices for the

last half period have not yet been fixed by the Government. The contract for structural steel, about 200 tons, required for the new building at the Buffalo plant of the J. H. Williams Co., manufacturer of drop forgings, has been awarded to the Ferguson Steel & Iron Co., this city, by the Ferguson Construction Co., Paterson, N. J., which holds the general contract for its construction.

British Steel Market

American Steel Nominal—Pig Iron Strong—Ferromanganese $250 for American Delivery

(*By Cable*)

LONDON, ENGLAND, April 10.

There is a brisk demand for Cleveland pig iron but transportation facilities are lacking. American wire rods and semi-finished steel are nominal. The tin-plate market is quiet but firm at 32s. basis. The ferromanganese market is irregular, $250 c.i.f. having been paid for forward shipment to Canada with the same quotation for forward shipment to Atlantic ports.

Solvent naphtha is quoted at 4s. 4½d., with benzol and toluol nominal. We quote as follows:

Tin plates coke, 14 x 20; 112 sheets, 108 lb., f.o.b. Wales. 32s.

Ferromanganese, $250, c.i.f. for export to America; £26 10s. for British consumption.

Ferrosilicon, 50 per cent, c.i.f. £35 upward.

On other products control prices are as quoted in THE IRON AGE of July 19, 1917, p. 171.

New York

NEW YORK, April 10.

Pig Iron.—The case of merchant blast furnaces in eastern Pennsylvania which have been suffering severely from coke shortage for many weeks has been strongly presented to the War Defense Board at Washington and positive assurance has been given that conditions in Pennsylvania will receive prompt attention and the supply of coke increased; in fact, already there has been some improvement and deliveries are moving forward to foundries more satisfactorily. Salesmen who have traveled through New England during the past week report that many foundries are badly in need of pig iron. Some are operating at from 40 to 50 per cent of capacity and are in danger of being compelled to close entirely. There is a very active demand for spot iron in New England and in all Eastern territory, but it is almost impossible to buy iron for such delivery. We quote as follows for tidewater deliveries:

No. 1 X	$35.25
No. 2 X	34.25
No. 2 plain	33.75
No. 1 Southern	$39.75 to 40.25
No. 2 Southern (rail and water)	39.00 to 39.25
No. 2 Southern (all rail)	39.15 to 39.65
No. 2 X Virginia	37.02

Ferroalloys.—The market for domestic ferromanganese is quiet but strong. There is considerable confusion as to just what market quotations really are since the new standards were proposed. One or two producers are quoting on the basis of 70 per cent standard ferromanganese at $250, delivered, with $4 per unit above or below this, but no sales are reported. In other directions the market is regarded to be $250 for 70 per cent alloy with no differential for a unit or two above this. One dealer has sold some 80 per cent alloy at $275, at steel works, for delivery before July 1. The market may be taken to be firm on a basis of $250 for 70 per cent alloy. Inquiries are fairly numerous, but some of those reported a week ago have been withdrawn. March import figures are expected to show a considerable increase over January and February. Production in March was 25,157 tons, according to the blast furnace reports of THE IRON AGE, or next to the largest month ever recorded. This includes all grades of ferromanganese above spiegeleisen, but is largely 75 to 80 per cent material. The spiegeleisen market is strong, with little available for sale this year. Fresh inquiries for lots of 300 to 500 tons each have appeared in addition to the 10,000 to 12,000 tons noted a week ago. No sales are reported. The quotations seem to be on the basis of the proposed new standard of $70, furnace, for 16 per cent alloy, and $3.50 per unit above this, though this is not established by sales. The March domestic output was 13,965 tons, as shown by reports to THE IRON AGE. Ferrosilicon, 50 per cent, is strong and fairly active at $155 to $165 per ton for forward delivery and up to $190 for spot and early delivery, depending on the amount wanted and the time. Various other ferroalloys in which there are few market changes from week to week are quoted in this paragraph in the first week of each month.

Old Material.—The Italian Government, which about a year ago purchased 50,000 tons of heavy melting steel for export, stored it at Baltimore and has been waiting in vain in the hope of getting ships in which to transport it to Italy. It finally decided that this would be impossible and has sold the scrap. This is expected to have a rather depressing effect on the market as far as heavy melting steel is concerned. The question of commissions is still the paramount one in the trade and business will continue to be unsettled until a decision is reached as to whether or not commissions can be paid. The present feeling among producers and dealers is that the payment of commissions will be permitted. Leading brokers are attaching to all sales the condition that payment of commission will be made if permitted by the Government. We quote prices of brokers as follows to New York producers and dealers per gross ton New York:

	Per Gross Ton
Heavy melting steel	$25.70 to $26.00
Rerolling rails	31.60
Relaying rails	60.00 to 70.00
Iron and steel car axles	44.00 to 44.30
No. 1 railroad wrought	31.50 to 31.80
No. 1 railroad wrought cut to not less than 10 in. or over 24 in	36.50 to 36.80
Wrought-iron track scrap	30.50 to 30.80
No. 1 yard wrought long	30.50 to 30.80
Light iron	9.00 to 10.00
Cast borings (clean)	15.25 to 15.75
Machine-shop turnings	15.25 to 15.75
Mixed borings and turnings	15.50 to 16.00
Iron and steel pipe (1 in. minimum diameter), not under 2 ft. long	29.75

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, are:

No. 1 machinery cast	$34.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	34.00
No. 1 heavy cast, not cupola size	29.00
No. 2 cast (radiators, cast boilers, etc.)	$27.00 to 28.00
Stove plate	25.00 to 26.00
Locomotive grate bars	25.00 to 26.00
Malleable cast (railroad)	34.00
Old carwheels	29.00

Finished Iron and Steel.—The market is one of opinion rather than facts. Good inquiries are constantly coming to sales offices, but they are given scant consideration. The trade is impressed with the present scarcity of steel, though with the admitted betterment in railroad transportation and our large steel producing capacity, many believe that mills will be seeking business on certain forms of steel within two months. They put in this class billets and wire rods in semi-finished lines, while at the present time it is possible to get some sizes of pipe and strip steel in four to six weeks' delivery. The evident intention of the Government to check movements of anything but war business is looked on with concern, and exporters contend that facilities might well be accorded them to export and thus further develop larger international credit with neutral nations. Shipping facilities in coastwise steamers to South American ports, while not necessarily of large carrying capacity would help, they urge, in the desired development. In speaking of the country's steel-making capacity, it seems likely that the scarcity in the less essential items of finished steel arises from the fact that rolling capacity is in excess of steel-making facilities, and steel being diverted for products most in demand leaves little for definite periods for rolling the less important products. About the only new structural project of size involves 1400 tons for two bridges for the Chesa-

peake & Ohio. Mill shipments are quoted as follows: Steel bars, 3.095c.; shapes, 3.195c.; plates, 3.445c., and bar iron, 3.695c., all at New York. Out-of-store prices are 1c. higher.

Cast-Iron Pipe.—A meeting of cast-iron pipe manufacturers was held a few days ago at which the price situation was thoroughly discussed. While there was a feeling that higher prices ought to be named by the Government, it is not probable that such action will be taken. The outlook now is that the present schedule will prevail until July 1. The demand from the Government for extensions of lines at cantonments continues. There is also some demand from shipbuilding plants. Government prices are as follows: $55.35, New York, for 6-in and heavier, and $58.35 for 4-in.; $65.35 for 3-in., and $1 additional for Class A and gas pipe.

IRON AND INDUSTRIAL STOCKS

Trading Very Dull—Liberty Loan Usurps Market Interest—Stocks Strong

Stock market activity last week dropped off to a so-called irreducible minimum, only 1,077,674 shares changing hands as compared with 3,895,651 shares in the same week of 1917. The attention of financial interests was centered almost entirely on the opening of the third Liberty loan campaign. Iron and steel stocks all advanced a bit showing the strong financial position of the present body of stockholders and faith in Allied military affairs.

The range of prices on active iron and industrial stocks from Wednesday of last week to Wednesday of this week was as follows:

Allis-Chalm. com.	23½- 25	Midvale Steel ..	45 - 46⅜
Allis-Chalmers pf.	79	Nat.-Acme	50½- 51½
Am. Can. com...	40¼- 42¾	Nat. Enam. & Stm. com.	48½- 50¾
Am. Car & Fdry. com.	78⅝- 80⅜		
Am. Loco. com..	61¾- 63½		
Am. Radiaor com.	250 -255	N. Y. Air Brake.....	125
Am. Ship com...	99 -110	Nova Scotia Steel.....	61
Am. Ship pf....	85 -100	Pressed Stl. com.	60 - 60¾
Am. Steel Fdries.	62¼- 63⅞	Pressed Steel pf.	95 - 96
Bald. Loco. com.	74½- 77½	Ry. Steel Spring com.	52⅝- 53½
Bald. Loco. pf.....	98½	Ry. Steel Spring pf.	96⅝
Beth. Steel com..	79¼- 79¾	Republic com. ..	78¼- 80¼
Beth. Stl. Cl. B.	77¼- 78¾	Republic pf.	97¾- 98
Cent. Fdry. com.	37¾- 39½	Sloss com.	51¼- 52¼
Cent. Fdry. pf...	48 - 53	Sloss pf.	87 - 87½
Chic. Pneu. Tool.	62¼- 64	Superior Steel	36
Colo. Fuel	38 - 39	Transue-Williams	39¾
Cruc. Steel. com.	62 - 63¾	Un. Alloy Steel..	38½- 39
Cruc. Steel pf...	88½- 89	U. S. Pipe com..	11½- 12
Deere & Co. pf..	96 - 96½	U. S. Steel com..	89¾- 91⅝
Gen Electric ...	138¼-139	U. S. Steel pf....	109 -110¼
Gt. No. Ore Cert.	27¼- 27¾	Va. I. C. & Coke.	67 - 68
Int. Har. of N. J. com.	118 -121¼	Warwick	7½- 8¼
Int. Har. Corp. pf.	97½- 98	Westingh. Elec..	40 - 40⅞
Lackaw. Steel ..	76 - 78		
Lake Sup. Corp..	14½- 15⅛		

Dividends

The Colorado Fuel & Iron Co., quarterly, ¾ per cent on the common and 2 per cent on the preferred, payable April 25.

The Crocker-Wheeler Co., quarterly, 2 per cent on the common and 1¾ per cent on the preferred, payable April 15.

The Dominion Steel Corporation, quarterly, 1½ per cent on the preferred, payable May 1.

The Westinghouse Air Brake Co., quarterly, $1.75, payable April 22.

The Wheeling Mold & Foundry Co., quarterly, 3 per cent on the common, payable May 1, and 2 per cent on the preferred, payable April 1.

Ferromanganese Imports Small in February

Ferromanganese imports in February were only 1417 gross tons as compared with 1050 tons in January. The January receipts are next to the lowest since early in the war. They fell below 2000 tons only once in 1917 or 1512 tons in November. The imports in January were received as follows: 600 tons through the port of Baltimore, 290 tons through Norfolk and 527 tons through Philadelphia.

Exports of ferromanganese in February were 632 tons, probably largely to Canada. The total for the eight months ended Feb. 28, 1918, have been 3513 tons or about one-fifth of the imports in that time, which were 17,252 tons.

Many Favor Commission on Scrap

Petitions being circulated by members of the American Board of Scrap Dealers for presentation to the War Industries Board asking that scrap dealers be permitted to charge consumers a commission on purchases of scrap for them have been signed by a large number of manufacturers. The petitions will first receive the attention of the Committee on Steel and Steel Products of the American Iron and Steel Institute, after which the matter will be formally presented to the War Industries Board. The petitions read as follows:

Hon. W. S. Brookings, Chairman,
Price Fixing Committee,
War Industries Board,
Washington.

Dear Sir:

The undersigned consumers of scrap iron and steel, dependent upon the use of this raw material for the manufacture of essentials, hereby petition you to grant to the scrap iron dealers an opportunity to carry on their usual functions by allowing them a commission, or compensation, for their service in securing for and delivering to us our requirements in scrap iron and steel.

We have always depended upon the knowledge and organization of the dealers to supply us with this material, but since the Government has fixed maximum prices which may be paid for the various grades of iron and steel scrap, they are unable to buy this material at less than the said maximum prices, and we are without the means or the organization for making these purchases ourselves.

It has been our habit to place with certain dealers orders for substantial tonnages at an agreed price, and they obligate themselves to deliver—and do deliver—the material we require. The sources of supply we understand are practically represented by every station in the country, and the sellers of material are accustomed to receiving cash in exchange for their scrap. We have neither the means nor the opportunity to make examination of the materials, or to ascertain which of all the producers supply the particular material most suited to our needs; nor could we within a period of many months, perhaps years, build up organizations to take the place of the dealers who have gradually grown with the expansion of the scrap business to a point where they employ very large and efficient organizations.

In our opinion the compensation of 3½ per cent., which was allowed to them on Dec. 28, should be reinstated. The commission cannot be paid by the seller, as it is in all other kinds of business where the material is manufactured, as in the case of scrap the seller is in an independent position, and holds his material for the highest price and is satisfied to wait until he gets it. Thus, under existing conditions scrap is not being brought to the market; the mills are generally running short and facing great danger as a result of this disturbance to the normal conditions existing in the trade.

We pray that our petition may be granted, and at the earliest moment, as the trade continues in a state of chaos in the meantime.

Will Not Commandeer Machine Tools

WASHINGTON, April 10 (*By Wire.*)—Reports current for several days to the effect that the Government is planning to commandeer a large number of machine tools for the purpose of greatly increasing the output of motor trucks are discredited by officials of the War Industries Board, who declare that nothing of the kind is in contemplation.

The further statement is unofficially made that the board would have no object at this time in speeding up the production of motor trucks when they are now being turned out more rapidly than they can be shipped to France. The supply for the use of the Army in the United States is understood to be entirely adequate and unless unexpected additions to the shipping facilities are speedily obtained, it may be advisable to reduce rather than to increase the production of trucks.

Hall blast furnace of the Republic Iron & Steel Co., at Sharon, Pa., idle for some time for relining and repairs, was blown in on Monday, April 1. Of the 26 stacks in the Mahoning Valley district 24 are active and only two idle, these being Niles furnace of the Carnegie Steel Co., at Niles, Ohio, and No. 1 stack of Republic Iron & Steel Co., at Haselton, Ohio, which is out for relining and repairs.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight rates from Pittsburgh on iron and steel articles, aside from wrought iron and steel pipe in carloads, per 100 lb., New York, 19.5c.; Philadelphia, 18.5c.; Boston, 21.5c.; Buffalo, 11.6c.; Cleveland, 13.5c.; Cincinnati, 18.5c.; Indianapolis, 20c.; Chicago, 21.5c.; St. Louis, 27c.; Kansas City, 47c.; minimum carload, 36,000 lb.; St. Paul, 40c.; minimum carload, 36,000 lb.; Denver, 79c.; minimum carload, 36,000 lb.; Omaha, 47c.; minimum carload, 36,000 lb.; New Orleans, 30.7c.; Birmingham, 46c.; Pacific Coast, $1.00; minimum carload, 80,000 lb. To the Pacific Coast the rate on steel bars and structural steel is $1.05, minimum carload, 40,000 lb.; and $1.00, minimum carload, 50,000 lb. On wrought iron and steel pipe the rate from Pittsburgh to Kansas City is 40c. per 100 lb., minimum carload 46,000 lb.; to Omaha, 40c., minimum carload 46,000 lb.; to St. Paul, 35.5c., minimum carload 46,000 lb.; Denver, 79c., minimum carload 46,000 lb. A 3 per cent transportation tax now applies. On iron and steel items not noted above, rates vary somewhat, and are given in detail in the regular railroad tariffs.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in. angles, 3 to 6 in. on one or both legs, ¼ in. thick and over, and zees, structural sizes, 3c.

Wire Products

Wire nails, $3.50 base per keg; galvanized, 1 in. and longer, including large-head barb roofing nails taking an advance over this price of $2, and shorter than 1 in., $2.50. Bright basic wire, $3.35 per 100 lb.; annealed fence wire, Nos. 6 to 9, $3.25; galvanized wire, $3.95; galvanized barb wire and fence staples, $4.35; painted barb wire, $3.65; polished fence staples, $3.65; cement-coated nails, $3.40 base; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 47 per cent off list for carload lots, 46 per cent for 1000-rod lots, and 45 per cent off for small lots, f.o.b. Pittsburgh.

Bolts, Nuts and Rivets

Large rivets ..... $4.65 base
7/16 in. x 6 in. smaller and shorter rivets. 45-10 per cent off list
Machine bolts h.p. nuts, ⅝ in. x 4 in.:
Smaller and shorter, rolled threads....50-10-5 per cent off list
Cut threads ..... 50-5 per cent off list
Larger and longer sizes..... 40-10 per cent off list
Machine bolts c.p.c. and t. nuts, ⅝ in. x 4 in.:
Smaller and shorter..... 40-10 per cent off list
Larger and longer..... 35-5 per cent off list
Carriage bolts, ¾ in. x 5 in.:
Smaller and shorter, rolled threads.....50-5 per cent off list
Cut threads ..... 40-10 per cent off list
Larger and longer sizes..... 40 per cent off list
Lag bolts ..... 50-10 per cent off list
Plow bolts, Nos. 1, 2, 3..... 50 per cent off list
Hot pressed nuts, sq., blank..... 2.50c. per lb. off list
Hot pressed nuts, hex., blank ..... 2.30c. per lb. off list
Hot pressed nuts, sq., tapped..... 2.30c. per lb. off list
Hot pressed nuts, hex., tapped..... 2.10c. per lb. off list
C.p.c. and t. sq. and hex. nuts, blank.....2.25c. per lb. off list
C.p.c. and t. sq. and hex. nuts, tapped.....2.00c. per lb. off list
Semi-finished hex. nuts:
⅝ in. and larger..... 60-10-10 per cent off list
9/16 in. and smaller..... 70-5 per cent off list
Stove bolts ..... 70-10 per cent off list
Stove bolts ..... 2½ per cent extra for bulk
Tire bolts ..... 50-10-5 per cent off list

The above discounts are from present lists now in effect. All prices carry standard extras.

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, $57; chain rods, $65; screw, rivet and bolt rods and other rods of that character, $65. Prices on high carbon rods are irregular. They range from $70 to $80, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes, 9/16 in. x 4½ in. and heavier, per 100 lb., $3.90, in lots of 200 kegs of 200 lb. each, or more; track bolts, $4.90. Boat spikes, $5.25 per 100 lb., f.o.b. Pittsburgh.

Terne Plate

Effective Nov. 7 prices on all sizes of terne plates are as follows: 8-lb. coating, 200 lb., $15 per package; 8-lb. coating, I. C., $15.30; 12-lb. coating, I. C., $16.75; 15-lb. coating, I. C., $17.75; 20-lb. coating, I. C., $19; 25-lb. coating, I. C., $20; 30-lb. coating, I. C., $21; 35-lb. coating, I. C., $22; 40-lb. coating, I. C., $23 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars at 2.90c. from mill, and 4.50c. to 5c. from warehouse in small lots for prompt shipment. Refined iron bars, 3.50c. in carload and larger lots, f.o.b. mill.

Wrought Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card, as announced Nov. 5 by the Government on steel pipe, those on iron pipe being the same as quoted for some time:

Butt Weld

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
⅛, ¼ and ⅜	44	17½	⅛ and ¼	23	+4
½	48	33½	⅜	24	+3
¾ to 3	51	37½	½	28	10
			¾ to 1½	33	17

Lap Weld

2	44	31½	1¼	18	3
2½ to 6	47	34½	1½	25	11
7 to 12	44	30½	2	26	12
13 and 14	34½	..	2½ to 6	28	15
15	32	..	7 to 12	25	12

Butt Weld, extra strong, plain ends

⅛, ¼ and ⅜	40	25½	⅛, ¼ and ⅜	22	5
½	45	32½	½	27	14
¾ to 1½	49	36½	¾ to 1½	33	18
2 to 3	50	37½			

Lap Weld, extra strong, plain ends

2	42	30½	1¼	19	4
2½ to 4	45	33½	1½	25	11
4½ to 6	44	32½	2	27	14
7 to 8	40	26½	2½ to 4	29	17
9 to 12	35	21½	4½ to 6	28	16
			7 to 8	20	8
			9 to 12	15	3

To the large jobbing trade an additional 5 per cent is allowed over the above discounts, which are subject to the usual variations in weight of 5 per cent. Prices for less than carloads are four (4) points lower basing (higher price) than the above discounts on black and 5½ points on galvanized.

On butt and lap weld sizes of black iron pipe, discounts for less than carload lots to jobbers are seven (7) points lower (higher price) than carload lots, and on butt and lap weld galvanized iron pipe are nine (9) points lower (higher price).

Boiler Tubes

The following are the prices for carload lots, f.o.b. Pittsburgh, announced Nov. 13, as agreed upon by manufacturers and the Government:

Lap Welded Steel		*Charcoal Iron*	
3½ to 4½ in.	34	3½ to 4½ in.	12½
2½ to 3¼ in.	24	3 to 3¼ in.	+ 5
2¼ in.	17½	2½ to 2¾ in.	+ 7½
1¾ to 2 in.	13	2 to 2¼ in.	+22½
		1¾ to 1⅞ in.	+35

Standard Commercial Seamless—Cold Drawn or Hot Rolled

	Per Net Ton		Per Net Ton
1 in.	$340	1¾ in.	$220
1¼ in.	280	2 to 2½ in.	190
1⅜ in.	270	2¾ to 3¾ in.	180
1½ in.	220	4 in.	200
		4½ to 5 in.	220

These prices do not apply to special specifications for locomotive tubes nor to special specifications for tubes for the Navy Department, which will be subject to special negotiation.

Sheets

Makers' price for mill shipments on sheets of United States standard gage in carload and larger lots, are as follows, 30 days net or 2 per cent discount in 10 days:

Blue Annealed—Bessemer	Cents per lb.
No. 8 and heavier	4.20
Nos. 9 and 10	4.25
Nos. 11 and 12	4.30
Nos. 13 and 14	4.35
Nos. 15 and 16	4.45
Box Annealed, One Pass Cold Rolled—Bessemer	
Nos. 17 to 21	4.80
Nos. 22 and 24	4.85
Nos. 25 and 26	4.90
No. 27	4.95
No. 28	5.00
No. 29	5.10
No. 30	5.20
Galvanized Black Sheet Gage—Bessemer	
Nos. 10 and 11	5.25
Nos. 12 and 14	5.35
Nos. 15 and 16	5.50
Nos. 17 to 21	5.65
Nos. 22 and 24	5.80
Nos. 25 and 26	5.95
No. 27	6.10
No. 28	6.25
No. 29	6.50
No. 30	6.75
Tin-Mill Black Plate—Bessemer	
Nos. 15 and 16	4.80
Nos. 17 to 21	4.85
Nos. 22 to 24	4.90
Nos. 25 and 27	4.95
No. 28	5.00
No. 29	5.05
No. 30	5.05
Nos. 30½ and 31	5.10

Metal Markets

The Week's Prices

	Copper, New York		Tin,	Lead		Spelter	
Apr.	Lake	Electro-lytic	New York	New York	St. Louis	New York	St. Louis
2	23.50	23.50	*85.00	7.10	6.95	7.25	7.00
3	23.50	23.50	*85.00	7.10	6.95	7.25	7.00
4	23.50	23.50	*85.00	7.00	6.90	7.25	7.00
5	23.50	23.50	*85.00	7.00	6.90	7.12½	6.87½
6	23.50	23.50	*85.00	7.00	6.90	7.12½	6.87½
8	23.50	23.50	*85.00	7.00	6.90	7.00	6.75

*Nominal.

NEW YORK, April 10.

The markets are all inactive and some are declining. Copper is quiet under the controlled conditions. Buying of tin is still held up because of lack of sellers. Lead has sagged on lack of demand. Spelter continues to decline. Antimony is lower.

New York

Copper.—March reports of some of the leading copper companies show an increase of about 17 per cent in output over that of February, and it is now confidently believed that April, if not March, will show a total output of about 200,000,000 lb. Conditions are favorable to an increase and some expect as high as 225,000,000 lb. per month later. The only disagreeable feature heard of is the mounting of refining costs due to the advance in the labor cost with a more or less stationary compensation for refiners under old contracts. An adjustment is believed necessary and higher prices for refining are not unlikely. It is stated that a prominent producer has recently returned from conferences in Washington so greatly encouraged that he feels more assurance as to a 25c. price for copper after June 1. Demand outside of war needs is fair and production and consumption continue closely regulated at 23.50c. for carloads and 24.67½c. for less.

Tin.—A scarcity of sellers continues to be the feature which has been the controlling factor for over two weeks. It is next to impossible to do any business, partly because of greatly delayed cables, and also because no quantities of tin are being offered. Business done in the last week has been small. Buyers are numerous and ready to commit themselves, and as a natural result prices are up all around. Future shipment from the Far East is now held at 78c. to 78.50c. for Straits tin, with other brands in proportion. Spot tin is still quoted nominal at 85c., New York, though higher bids appeared in the last few days for a 5-ton lot. Deliveries in March at the Pacific Coast were 3451 tons, making the total for the month 5151 tons. This is comparatively large, the average for the five years previous to 1917 having been 4140 tons per month. Tin arrivals to April 7 have been 170 tons, with 5000 tons estimated as afloat. The London market is £2 per ton higher than last week, spot Straits yesterday having been quoted at £319 10s.

Lead.—Lack of demand has forced the market down until the outside market yesterday stood at 7c., New York, or 6.90c., St. Louis, for early delivery. There has been no change in the quotation of the leading producer, which still stands at 7.25c., New York. There is a distinct lack of interest and no demand, or 7c. lots would be readily absorbed. Some leading sellers, however, have no metal to offer and one big independent producer has shut down because of labor troubles. While the market is easy it contains an element of strength and may right about face at any minute.

Spelter.—The market has continued to decline and prime Western for early delivery was selling yesterday at 7c. to 7.12½c., New York, with the St. Louis quotation at 6.75c. to 6.87½c. Spot metal is selling at about 7.25c., New York. Desire on the part of some to convert metal into cash continues the dominant influence. The market is close to a crisis, and it is known that several large producers are reducing output decidedly or shutting down altogether.

Antimony.—On light demand the market continues soft, with Chinese and Japanese grades quoted at 12.75c. to 13c., New York, duty paid.

Aluminum.—Government prices control the market. They are 32c. per lb. for No. 1 virgin metal, 98 to 99 per cent pure, in 50-ton lots, with 32.10c. fixed for 15 to 50 tons, and 32.20c. per lb. for 1 to 14-ton lots.

Old Metals.—The market continues quiet. Dealers' selling prices are nominally as follows:

	Cents per lb.
Copper, heavy and crucible	23.50
Copper, heavy and wire	23.50
Copper, light and bottoms	21.00 to 21.50
Brass, heavy	16.25 to 16.50
Brass, light	12.25 to 12.50
Heavy machine composition	23.75 to 24.00
No. 1 yellow rod brass turnings	13.50 to 14.00
No. 1 red brass or composition turnings	19.00 to 20.00
Lead, heavy	6.62½
Lead, tea	5.75
Zinc	5.87½

Chicago

APRIL 8.—Easier railroad conditions are contributing materially to better deliveries of copper, for which there is a steady demand from those having Government contracts and elsewhere. The market in tin is a difficult one to diagnose. Except for small lots of spot metal, none is offered and the future presents a puzzle. In lead there is some movement, but it is not up to normal. Considerable spelter has been bought at the lower price now prevailing, but the market is weak because of the excessive productive capacity. No interest is taken in antimony. We quote: Copper in carload lots, 23½c.; in part carloads, 24.67½c.; lead at 6.95c.; spelter at 6.95c.; tin at 90c., and antimony, 15c. On old metals, we quote buying prices for less than carload lots as follows: Copper wire crucible shapes, 21c.; copper clips, 21c.; copper bottoms, 19c.; red brass, 21c.; yellow brass, 15c.; lead pipe, 5½c.; zinc, 5c.; pewter, No. 1, 55c.; tin foil, 55c., and block tin, 70c.

St. Louis

APRIL 8.—Non ferrous metals have remained rather quiet during the week, with some weakness shown in zinc, though no great quotable changes took place in the market. The quotations at the close to-day on car load lots were: Lead, 7c.; spelter, 7c. to 7.25c. On less than car load lots the figures were: Lead, 7.50c.; spelter, 8.25c.; tin, 90c.; copper, 25.12c.; Asiatic antimony, 17.50c. In the Joplin district, there was a weaker tendency in zinc blende and the top price fell off about $2.50 per ton. The range for the district was from $40 to $60 per ton, basis of 60 per cent metal with the average for the week for the district, because of the disposal of low grade ores, between $45 and $47.50 per ton. Calamine ranged from $30 to $35 per ton, basis of 40 per cent metal, with the average for the week for the district at $34 per ton. Lead ore was steady at $85 per ton, basis of 80 per cent metal, and the average for the week for the district was $85, because of the premium grades turned in at the sales. On miscellaneous scrap metals, we quote dealers' buying prices as follows: Light brass, 10c.; heavy yellow brass, 14c.; heavy red brass and light copper, 19.50c.; heavy copper and copper wires, 20c.; pewter, 25c.; tinfoil, 50c.; zinc, 5c.; lead, 5.50c.; tea lead, 5c.

Prices Fixed on Nickel

An agreement has been entered into between representatives of the International Nickel Co. and Bernard Baruch, representing the Council of National Defense, fixing the price of nickel at 40c. per lb. for the highest grade and 38c. per lb. for the lower grade. Nickel is being used in increasing quantities daily in making munitions. Practically all nickel produced by the International Nickel Co. is pledged to the Allies in advance, and only what the Allies do not want is sold to the public. No nickel can be sold by the company except with the consent of the British Government. The price previous to this was 50c. to 55c. per lb.

Wage Advance Announcements

The Cambria Steel Co., Johnstown, Pa., has announced a general advance in wages, averaging about 15 per cent, at its works, effective April 16. The increase will affect about 18,000 men.

Effective April 16, the Lukens Steel Co. and the Midvale Steel & Ordnance Co., Coatesville, Pa., will increase the wages of general labor at the mills from 27½ to 32 cents an hour, affecting about 5000 men.

The Phoenix Iron Co., Phoenixville, Pa., has announced a wage advance of 10 per cent at its works, effective April 15. The company is now operating on Government work, having two large contracts from the War Department.

Shop employees of the Erie Railroad Co., at Stroudsburg, Pa., have received an increase in wages. Men employed in the mechanical and stores department will operate under a 5 per cent increase for piecework, with the adoption of a bonus plan of 5 per cent on earnings, effective April 1, to be paid monthly.

Effective April 7, the Alan Wood Iron & Steel Co. has advanced the wages of employees at its Conshohocken and Ivy Rock, Pa., works, 15 per cent. Laborers have received an increase from 30 to 35 cents an hour.

Commencing April 15, employees at the plant of the Central Iron & Steel Co., Harrisburg, Pa., will receive a wage increase. The rate for general labor will be advanced about 15 per cent, with corresponding increase in other branches of the works. About 1400 men will be affected.

The Jones & Laughlin Steel Co., Pittsburgh, has announced that it will grant its employees a 15 per cent advance in wages, effective April 15. It will affect the men employed at the Eliza blast furnaces, Soho Works, Southside Works, and also employees of its Aliquippa blast furnaces, steel works and finishing mills, except the tin plate labor, which is governed by the Amalgamated scale, but which the company does not sign. All told 15,000 or more men will benefit. Other steel companies in the Pittsburgh district will also grant 15 per cent increase in wages, but have not yet made official announcements.

Smelting Manganese Ore in Washington

The Seattle Smelting Co., Inc., at Van Asselt Station, Seattle, began operations the first of the year, producing ferromanganese in an electric smelter. After a month of delays, 20 tons of ore are being handled per day. A 3-phase open-top electric furnace is used having a 5-ton output when the right quality of ore is used. The sources of ore are Montana, British Columbia and Oregon. When transportation from the Olympics in Washington has been solved another field will be opened. A 13,000-volt transformer which steps down to 60 volts is used. August Mehlhorn, Jr., is president; Henry G. Runkel, secretary-treasurer, and George W. White, chemical engineer.

Price of Coke for Far West

Fuel Administrator Garfield on April 4 authorized an increase of 5 per cent in the basic price of coke manufactured east of the Mississippi River and sold west of the Rocky Mountains.

It was announced that the increased price is intended to facilitate movement and distribution of coke in the Western section of the country by meeting the additional expense incurred in shipment. The seller must assume responsibility for quality and delivery, extend credit and carry the account of the purchaser in accordance with usual trade practices.

The new plant of the Liberty Steel Co., Warren Ohio, will commence operations within about two weeks. The plant is equipped with eight tin mills, all of which will be started. It is expected that much of its sheet bar requirements will be supplied eventually by the Trumbull Steel Co., which has recently placed in operation a portion of its open-hearth furnaces.

Rushing Legislation to House Workers

WASHINGTON, April 10 (*By Wire*).—In response to appeals from Government officials and the managers of a number of large munition plants, the Senate Committee on Public Buildings and Grounds has decided to give continuous consideration to the housing bill until a vote is taken on the question of reporting it to the Senate. An earnest effort will be made by the managers of the bill to get it out of committee and through the Senate before the end of the week.

Notwithstanding the importance of early action, however, certain members of the Senate Committee are disposed to hold the bill up and to force into it an amendment providing that the fund of $60,000,000, of which $10,000,000 is intended to provide housing for Government clerks at Washington, shall be administered by a board of several persons instead of by a single director, as has been planned by the Department of Labor. It is believed, however, that this element in the committee is in the minority, and it is possible that at to-day's session an order may be given taking the bill into the Senate with a favorable report.

The necessity for housing at some of the largest munition plants has become so urgent that Chairman Baruch of the War Industries Board has appealed to the Senate Committee on Military Affairs to institute an emergency appropriation, to be made immediately available, to take care of the situation at the Bethlehem Steel Co.'s plants and several other establishments working on large ordnance contracts. The committee has taken Mr. Baruch's recommendation under advisement, but it is probable that the committee will merely co-operate in the effort to pass the big housing measure.

Rapid progress has already been made in planning the work of the housing bureau and as the bill has already passed the House and will be signed by the President as soon as received from the Senate, it is quite possible the bill may become a law before the end of the week. W. L. C.

Cuban Manganese Ores

Only a small number of the many manganese ore mines in Eastern Cuba can be operated at a profit even with the present high prices, says U. S. Consul, N. M. Wolcott, Santiago de Cuba. Lack of proper transportation facilities and of good roads is the great drawback. With three exceptions, the mines have to haul their ore to the railroad in ox or mule carts or by pack mules 3 to 15 miles at a cost of $3.50 to $10 per ton. Some American mine owners are now using motor trucks or tractors and it is hoped to overcome some of the difficulties.

The most important groups of these mines are the Ponupo and Cristo. The Ponupo group produces at present about 5000 tons of ore a month, averaging from 38 to 40 per cent manganese, and rather low in silica and iron. As this group is near the line of the railroad, the ore is mined and shipped at a profit under present prices. The Cristo group consist of several small claims which at present produce approximately 4000 tons of ore monthly. The mineral runs slightly higher in manganese and about the same in silica and iron as the Ponupo ore, but the greater part of it requires washing. The Palmarito and Los Negros groups produce each about 1000 tons monthly. The ore is high grade and very low in silica and iron. Considerable modern machinery has recently been installed at the San Nicolas mines, and it is expected that several thousand tons monthly will soon be produced there. The remaining four groups have a combined monthly production at present estimated at 1000 tons, making the total for the province approximately 12,000 tons monthly, all of which is exported to the United States through the ports of Santiago and Nipe.

Repairs to the buildings and machinery at the Steelton, Pa., quarries of the Bethlehem Steel Co. have been completed and the men employed there resumed work April 8 after a two-week shutdown.

PERSONAL

F. E. Norris, for 11 years superintendent of the Farrell and Sharon, Pa., plants of the Carnegie Steel Co., has resigned, and as soon as he secures his transports will sail for France to superintend the erection of a steel plant for the Berliet Automobile Mfg. Co. This plant will contain two small open-hearth furnaces, a small blooming mill and a finishing mill. O. J. H. Hartsuff, for some years superintendent of the New Castle, Pa., works of the Carnegie Steel Co., has been appointed to succeed F. E. Norris as superintendent of the Farrell and Sharon works. George A. Rigby, for some years master mechanic of the New Castle works, has been appointed assistant general superintendent of this plant, under Mr. Hartsuff. All these changes are effective from April 1.

J. R. Dunsford, formerly sales agent of the American Steel Foundries, has resigned to accept a similar position with the Wheeling Mold & Foundry Co., Wheeling, W. Va.

C. J. Wolf, formerly manager of the New York branch office of the United Smelting & Aluminum Co., New Haven, Conn., is now associated with the American Steel Co., Park Building, Pittsburgh.

Horton Penrose, since 1901 resident manager of the Pittsburgh office of Shimer & Co., sales agent for the American Manganese Mfg. Co., operating two furnaces at Dunbar, Pa., in the manufacture of ferromanganese and other alloys, and also for the Atlantic Ore & Alloys Co., has been promoted to the position of assistant to the president of the company, with offices in Philadelphia. F. G. Schultz, for some years salesman in the Pittsburgh office, succeeds Mr. Penrose as Pittsburgh manager.

Herbert H. Evans has succeeded H. R. Walton as sales manager of the Coatesville Boiler Works, Coatesville, Pa., whose sales office for Pennsylvania and Maryland is in the Morris Building, Philadelphia.

J. A. Galligan, sales manager of the coke department of Pickands, Brown & Co., Chicago, has been appointed coke representative in the Chicago district of the United States Fuel Administration. Better posted than perhaps any other man through his connection with the Bi-products Coke Corporation, manufacturer of Solvay coke, Mr. Galligan for some time has been rendering service to the Government and now will do so in an official capacity. He will remain at his office at 332 South Michigan Boulevard.

A. L. Cromlish, superintendent Carnegie Steel Co.'s blast furnaces at Farrell, Pa., has been elected a director of the Colonial Trust Co., succeeding W. H. Davis, who left recently to assume the management of the American Sheet & Tin Plate Co.'s tin mill at Morgantown, W. Va.

Thomas A. Baldwin, Harrisburg, Pa., for several years assistant superintendent in the erection department, bridge and construction department of the Steelton, Pa., plant of the Bethlehem Steel Co., has been commissioned a senior lieutenant in the United States Navy and will leave next month for the war zone in France to supervise the construction of structural steel radio towers, 800 ft. high.

George W. Wildin, recently general manager of the New York, New Haven & Hartford Railroad, and for many years its chief mechanical engineer, has become general manager of the Locomotive Stoker Co., Pittsburgh, a subsidiary of the Westinghouse Airbrake Co.

H. P. Curtiss, formerly representative of the American Blower Co. of Detroit, has been appointed representative in the New England states of the Clarage Fan Co., Kalamazoo, Mich. Mr. Curtiss's office will be at 120 Milk Street, Boston.

Henry Brewer, for four years a member of the engineering staff of the Beloit works of Fairbanks, Morse & Co., in charge of the development of oil engine design, has resigned and on April 1 assumed the position of chief engineer of the combustion engine department of the Worthington Pump & Machinery Corporation at Cudahy, Wis.

D. B. Clark, who was formerly superintendent of the shell department at the American Brake Shoe & Foundry Co., Erie, is now general superintendent of the Watervliet Arsenal, Watervliet, N. Y. This arsenal is the largest and oldest in the United States, and Mr. Clark has charge of its entire production.

At a meeting of the board of directors of the C. L. Best Gas Traction Co., San Francisco, March 23, Mr. Best was elected president of the company to succeed C. A. Hawkins. H. C. Montgomery was elected vice-president and John R. Buck was chosen second vice-president and treasurer.

Leo Loeb has joined the organization of Day & Zimmermann, Inc., construction and management engineers, Philadelphia.

Frank O. Wells, president of the Greenfield Tap & Die Corporation, Greenfield, Mass., is a director of the Lincoln Twist Drill Co., Taunton, Mass.

E. H. Nelson has resigned as chief engineer of the Blake-Knowles plant of the Worthington Pump & Machine Corporation, to become general works manager of the Griscom-Russell Co., at Massillon, Ohio.

Forrest H. Blanding, formerly superintendent of the McEwen Mfg. Co., Tulsa, Okla., has accepted a similar position with the ordnance works of the Otis Elevator Co., Chicago.

Julius Nahoum, who resigned as managing director of the Vulcan Trading Corporation on Jan. 30, has accepted the management of the Bi-Continent Trading Corporation, 50 Broad Street, New York City.

Mrs. L. G. Edwards, who formerly held a responsible position in the advertising department of the National Tube Co., Pittsburgh, is now connected in a similar capacity with the A. M. Byers Co., Inc., Pittsburgh, whose advertising department is in charge of N. Bowland.

Wm. Allan Ragan, formerly special sales agent of the United States Reduction Co., has been appointed sales representative of the United Smelting & Aluminum Co., Inc., New Haven, Conn., in the states of Indiana and western Ohio.

Howard J. Griffin, who has been the Chicago district manager of the Milwaukee Electric Crane & Mfg. Co., has been appointed district manager of the Pittsburgh office of that company effective May 1. He was formerly with the Allis-Chalmers Mfg. Co. for about 15 years.

At a recent meeting of the stockholders of the E. J. Flather Mfg. Co. the name of the corporation was changed to the Flather Mfg. Co. E. J. Flather is retiring from the active management, but will continue with the company as consulting engineer. H. E. Flather was elected president and Edwin Morey, treasurer.

Major James T. Speer, of the Pittsburgh Valve, Foundry & Construction Co., Pittsburgh, who has been confined in a hospital in that city for some time, fell recently and broke a rib. This accident, coming under existing conditions, is causing some grave apprehension among his friends.

H. D. Savage has been elected vice-president of the Locomotive Pulverized Fuel Co., New York. He will also continue as vice-president of the American Arch Co. Mr. Savage started his business life with the Ashland Fire Brick Co. in the manufacturing department, serving in various capacities. Later he was appointed manager of sales and during his 10 years in this position he made much progress toward putting the manufacture of high-grade refractories on a scientific basis. Together with the late E. S. Hitchens he organized the Refractory Manufacturers' Association, of which he was elected the first president. Mr. Sav-

age's work as sales manager gave him opportunity to thoroughly study the application of refractories to the metallurgical field. In 1914 he was elected vice-president of the American Arch Co., in charge of manufacturing. In 1917, in addition to his duties as vice-president of the American Arch Co., he was appointed manager of sales of the Locomotive Pulverized Fuel Co.

Sharp Increase in Steel Ingot Production in March

The American Iron and Steel Institute has just compiled the statistics of steel ingot production in the United States for March. Returns from 29 companies, which made 88.14 per cent of the ingot production in 1916, show an output in March of 2,331,048 gross tons of open-hearth ingots, 763,255 tons of Bessemer ingots and 16,078 tons of all other ingots, or a total of 3,110,381 tons. If the companies not reporting produced in March the same proportion of the total as in the year 1916, the March total would have amounted to 3,528,909 tons. In the table below the American Iron and Steel Institute gives the production of steel ingots by the 29 companies for the ten months ending with March, all figures representing gross tons:

	Open Hearth	Bessemer	All Other	Total
June, 1917	2,265,772	809,552	8,605	3,083,929
July	2,152,479	777,171	9,465	2,939,115
August	2,251,013	863,873	8,331	3,123,217
September	2,195,556	770,064	6,639	2,972,259
October	2,475,754	870,494	5,687	3,351,935
November	2,384,218	772,489	9,550	3,166,257
December	2,195,832	524,084	13,806	2,733,722
January, 1918	1,763,356	429,588	10,901	2,203,845
February	1,805,233	454,457	14,051	2,273,741
March	2,331,048	763,255	16,078	3,110,381

It will be seen that the March output was exceeded in only three other months in the period named—that is, in August, October and November. The March output was 238,379 tons greater than the average for the preceding nine months and 57,462 tons greater than the average reported for the last seven months of 1917. Counting 50 working days in January and February, the average ingot production by the 29 companies in these months was 89,551 tons. In the 26 working days of March the average was 119,630 tons a day, or an increase of about 30 per cent.

Building Not Essential to Winning War Discouraged

The Council of National Defense has issued a statement saying that the following resolution has been passed by the War Industries Board:

Whereas, It has come to the notice of this board that new industrial corporations are being organized in different sections of the United States, for the erection of industrial plants which cannot be utilized in the prosecution of the war; and

Whereas, Plans are being considered by certain states, counties, cities and towns for the construction of public buildings and other improvements which will not contribute toward winning the war; and

Whereas, The carrying forward of these activities will involve the utilization of labor, materials and capital urgently required for war purposes;

Now, Therefore, Be It Resolved, By the War Industries Board that in the public interest, all new undertakings not essential to and not contributing either directly or indirectly toward winning the war, which involve the utilization of labor, material and capital required in the production or distribution of direct or indirect war needs, will be discouraged, notwithstanding they may be of local importance and of a character which should in normal times meet with every encouragement.

Be It Further Resolved, That in fairness to those interested therein, notice is hereby given that this board will withhold from such projects priority assistance, without which new construction of the character mentioned will frequently be found impracticable, and that this notice shall be given wide publicity, that all parties interested in such undertakings may be fully apprised of the difficulties and delays to which they will be subjected and embark upon them at their peril.

WILL DISCUSS COKE

Important Conference Will Be Held at Washington This Week

WASHINGTON, April 10 (*By Wire*).—An important conference looking to the distribution of coke, to be held in Washington, Thursday, April 11, has been called by the Coke Division of the Fuel Administration. Representatives of coke-producing companies in Ohio and western Pennsylvania will meet with officials of the Fuel Administration and others. The conference will discuss the distribution of coke for foundries, brass works, etc., in northern Ohio, it being planned to supply these from a surplus at the by-product plant of a large Cleveland company.

Efforts are planned to increase the shipments of foundry coke east from the Greensburg, Pa., district. There is a serious shortage of foundry coke east of Pittsburgh, due to lack of sufficient facilities for movement of coke in that direction. Utilization of the Cleveland surplus to care for the needs of that vicinity is to relieve the railroads of any unnecessary burden.

The Fuel Administration has called a conference of all State fuel administrators from the states east of the Mississippi River for to-day and Thursday.

The conference will discuss the general conservation and early buying plans for the coming year, and their relation to the State fuel administrator, with particular reference to retail distribution. Under the head of conservation will be details of the lightless night, wood campaigns and the skip-stop system on trolley lines.

Proposed Change in Aircraft Board

Although no formal announcement has yet been made, it appears certain that a complete reorganization of the aircraft work of the Government will be effected. Reports from Washington state that William C. Potter of New York, formerly in charge of the production end of the Guggenheim interests, will succeed Howard Coffin as chairman of the Aircraft Board. The board itself may be dispensed with, giving virtually one-man control of the aircraft program. Mr. Potter, it is assumed, will work directly under Edward R. Stettinius, Second Assistant Secretary of War. Large new contracts for airplane motors which are now pending will probably be announced as soon as the reorganization is completed.

There are reports that the Liberty motor is to be used exclusively for bombing and scouting machines and that Rolls-Royce, Sunbeam and Hispano-Suiza motors will be used for fighting airplanes. The English Government recently placed large contracts with manufacturers in this country for Rolls-Royce motors.

Electric Products Companies Merged

PITTSBURGH, April 9 (*By Wire*).—Announcement has just been made by the Westinghouse Electric & Mfg. Co. that as of April 1 the Copeman Electric Stove Co. will be merged in a new company to be known as the Westinghouse Electric Products Co., with headquarters and plant at Mansfield, Ohio. This plant will be devoted to the manufacture of heating appliances previously made at the Newark works of the Westinghouse Electric & Mfg. Co. and the Flint, Mich., works of the Copeman Electric Stove Co. The general operations of the Westinghouse Electric Products Co. will be directed by W. K. Dunlap as general manager, who is also assistant to the vice-president of the Westinghouse Electric & Mfg. Co.

The Alan Wood Iron & Steel Co., Philadelphia, expects to complete a new 500-ton blast furnace in August. This will make the third furnace at the Wood plant.

Machinery Markets and News of the Works

MAY ORDER BIG GUNS SOON

German Drive Speeds Up Ordnance Plans

Increasing Activity in Shipbuilding Work—Motor Truck Program Doubled

The German drive in France may result in the early completion of negotiations by the Ordnance Bureau of the War Department with companies which are to make heavy artillery. As announced recently in THE IRON AGE, the artillery program is a large one and will probably involve the construction of new plants. It is not expected that results in finished guns will be had before late in 1919 or the spring of 1920. The machine-tool requirements will be very large.

Shell makers have received orders from Washington to double their output. The American Can Co. is asking for a large number of new tools. Another Eastern shell-making company will double the size and equipment of its plant.

The Spicer Manufacturing Corporation, South Plainfield, N. J., is in the market for a large number of new tools, including grinders, millers, thread millers, die-sinking machines and hand turret lathes, for work on universal joints.

Shipbuilding companies are coming into the market for various kinds of equipment, indicating a speeding up of the shipbuilding program. Among the purchasers or prospective purchasers of cranes, punching and shearing machinery, etc., are the Chickasaw Shipbuilding Co., Mobile, Ala.; Federal Shipbuilding Co., New York; Merrill & Stevens Shipbuilding Corporation, Jacksonville, Fla.; Chester Shipbuilding Co., Chester, Pa.; Virginia Shipbuilding Corporation, Alexandria, Va.; Groton Iron Works, Groton, Conn.; Sun Shipbuilding Co., Chester, Pa.; Southern Shipbuilding Co., Brunswick, Ga., with office at 17 Battery Place, New York.

Production of Liberty motor trucks and motors has been speeded up by request of General Pershing. Many companies are adding to their equipment, and in some cases tools have been commandeered for them.

Large gun-boring lathes have been commandeered for the American Bridge Co.'s Ambridge, Pa., plant, but no information is available as to what gun work, if any, this company is doing. The Watervliet Arsenal, Watervliet, N. Y., is buying another lot of tool equipment.

Crane inquiry is not large. There are indications of slight shading of prices on traveling cranes.

New York

NEW YORK, April 9.

Evidences of increasing activity in shipbuilding are noted in the machinery trade. The Chickasaw Shipbuilding Co., Mobile, Ala., a subsidiary of the United States Steel Corporation, has purchased 18 punching machines and other fabricating equipment. The Southern Shipbuilding Co., in which Whittlesey & Whittlesey, 17 Battery Place, are interested, will go ahead with the construction of a shipyard at Brunswick, Ga., which was planned many months ago. Equipment will be purchased soon. The Foundation Co., Woolworth Building, New York, is reported to have contracts for several new shipyards and will buy some of the equipment. The Virginia Shipbuilding Corporation, Alexandria, Va., is buying additional equipment. The Chester Shipbuilding Co., Chester, Pa., is buying on a list of 71 miscellaneous machines issued a few weeks ago. The Sun Shipbuilding Co., Chester, Pa., has bought two radial drills. The Groton Iron Works, Groton, Conn., is in the market for a crane and may buy other equipment. The Merrill-Stevens Shipbuilding Corporation, Jacksonville, Fla., is again in the market. The shipyards have received orders to speed up and more activity in buying may now be expected.

New ordnance work is not coming out from Washington as rapidly as expected, but a number of manufacturers in this territory are figuring on contracts. The Ingersoll-Rand Co., New York, has made tentative inquiries for equipment for making recoil mechanisms for 75-mm. field guns. The equipment bought, if the contract is closed, will largely consist of milling machines, special boring lathes and hand screw machines.

Large gun-boring lathes have been commandeered by the Government for the American Bridge Co.'s plant at Ambridge, Pa.

Production of Liberty motor trucks and motors has been speeded up. Tools have been commandeered for a number of plants so that they can double their output of trucks and parts.

The Watervliet Arsenal continues to buy. The Tock Screw Machine Products Corporation, Long Island City, N. Y., is buying a few tools.

Shipments of tools from Eastern factories are said to be very large despite the transportation difficulties. Middle Western factories have in some instances been forced to ship tools to Boston and then re-ship them in order to get them to New York or vicinity.

The crane inquiry is light and the tendency of builders is to shade prices slightly. The Thomas Iron Co. is asking for bids on a 20-ton crane for its blast furnaces at Hellertown, Pa. The Interborough Railroad of New York wants a 3-ton hand-power crane. The Mansfield Foundry Co., Mansfield, Mass., which inquired some time ago for a 5-ton crane, has changed its specifications to a 10-ton. The Groton Iron Works, Groton, Conn., asks for bids on a 3-ton, 50 ft. span, boiler-shop crane. The Merrill-Stevens Shipbuilding Corporation, Jacksonville, Fla., requires one 50-ton crane, 60 ft. span, and two 25-ton cranes, 60 ft. span. The Cambria Steel Co., Philadelphia, is asking for bids on 22 hoists of 1500 lb. capacity each. The Brooklyn Navy Yard will buy four 2-ton cranes.

The Hawes Foundry & Equipment Co., which is controlled by the same interests as the John Wilfert Co., manufacturer of valve fittings, piping, etc., 258 Broadway, New York, has purchased outright the plant and business of the Central Bronze Co., 44-50 Steuben Street, Brooklyn, to be used as an auxiliary to its present plant in Elizabethtown, Pa. The company, with a capitalization of $250,000, has completed the deal in order to take care of its domestic business, the Elizabethtown plant being taken over completely for Government work. The new plant is already in operation and is also being enlarged. It will turn out a complete line of bronze fittings and valves for steam engineering, industrial and shipbuilding work. All selling of its products will be done through the John Wilfert Co.

The Menten Brass Co., recently incorporated with a capital stock of $25,000, has established a foundry and brass machine shop with offices at 76 Lexington Avenue, Brooklyn, for the manufacture of high-grade alloy castings. Alfred J. Menten is president.

Fire caused a loss of over $30,000 to the plant of the W. G. Browne Mfg. Co., manufacturer of hardware specialties, etc., Kingston, N. Y., March 16. The company has re-established its manufacturing department in temporary quarters pending the completion of a new plant, which is expected to take about two months. Not over two weeks' delay in deliveries is anticipated. E. H. Bogart is president.

The Bureau of Yards and Docks, Navy Department, Washington, has awarded contract for a new plant at South Schenectady, N. Y., to cost about $1,000,000.

The Driver-Harris Co., Middlesex Street, Harrison, N. J., manufacturer of wire, etc., has taken bids for the construction of a two-story addition, 75 x 120 ft.

The Richardson Scale Co., Colfax Avenue, Athenia, N. J.,

has acquired a controlling interest in William Bartley & Sons, Inc., operating a foundry at Bartley, N. J., by the purchase of the stock held by Augustus H. Bartley. The new owner will operate the plant as heretofore, specializing in the production of castings, and will devote a large part of the output to castings for use at its Athenia works.

The new addition to the plant of the W. & A. Fletcher Co., 1301 Hudson Street, Hoboken, manufacturer of marine engines, boilers and kindred products, will consist of a three-story building, 50 x 100 ft., on Hudson near Twelfth Street, to cost $38,400.

The Singer Mfg. Co., 149 Broadway, New York, manufacturer of sewing machines, has awarded a contract for a one-story brick addition to its works at Elizabethport, N. J., 200 x 600 ft., to cost about $300,000. The Austin Co., Bulletin Building, Philadelphia, is the contractor.

The Triplex Safety Glass Corporation, 120 Broadway, New York, manufacturer of reinforced glass for windshields, port lights, etc., has closed negotiations for a seven-acre site at Mount Vernon, N. Y., for about $80,000 as site for a new plant.

Catalogs Wanted

The Zin-Ho Mfg. Co., Fisher Building, Chicago, is revising its catalog files and desires new publications from manufacturers.

New England

BOSTON, April 9.

While there is no perceptible drop in the output of New England machine tool factories, there is sufficient slackening of orders so that many of the plants are catching up on deliveries. In the small tool field, however, the scarcity of labor and to some extent of materials is preventing larger output to meet a very heavy demand. Small machine shops throughout New England seem to be consistent buyers of tools, and more shops are reported each week as having secured subcontracts or tool and gage work. Munitions plants are increasing their output steadily, and the shipyards are beginning to get into their summer stride. Both Government and private munitions plants are still buying a few tools, but no large lists are reported.

The Narragansett Machine Co., Vale Street, Pawtucket, R. I., suffered a loss by fire, April 4, of about $150,000, mostly confined to that portion of the plant manufacturing gymnasium apparatus and to its lumber storage sheds. The company is engaged in making machinery and balloon winches for the Government.

The Acme Tool & Machine Co., Derby, Conn., has been incorporated with authorized capital stock of $100,000. The incorporators are Albert K. Kennedy, Derby; Harry G. Williams, Shelton, and Harold E. Drew, Ansonia.

The Jenkinson Machine & Tool Co., Providence, R. I., has been incorporated with authorized capital stock of $30,000. The incorporators are Robert Jenkinson, Mansfield, Mass.; Robert S. Ortoleva and Sebastian H. Di Jester, Providence.

The Simonds Mfg. Co., Fitchburg, Mass., is having plans drawn for an addition, 50 x 140 ft., three stories.

The New Haven Special Machinery Co., New Haven, Conn., has been incorporated with authorized capital stock of $25,000. The incorporators are Harris Botwinck and Hyman Botwinck, New Haven, and Charles L. Smith, Bridgeport.

The B. F. Sturtevant Co., Williams Street, Boston, has awarded a contract for a one-story addition, 86 x 228 ft., to its aircraft plant.

The Temple Mfg. Co., Providence, R. I., has been incorporated with capital stock of $5,000 to manufacture tools and machinery. The incorporators are John M. Gibb, 42 Temple Street, Providence, Carl A. Tingler and Joseph C. Condon.

The Brown Foundry, Stamford, Conn., has begun the erection of an addition, 90 x 130 ft. The company is working on indirect Government contracts for brass castings and marine engines.

The Worthington Pump & Machinery Corporation, Blake & Knowles Works, 265 East Third Street, Cambridge, Mass., has awarded a contract for the construction of a foundry yard craneway, 60 x 60 x 307 ft., to cost $25,000.

The Naugatuck Crucible Co., Huntington, Conn., has increased its capital stock from $250,000 to $450,000.

The Saco-Lowell Co., Biddeford, Me., is having plans drawn for a one and two-story addition.

The Shelton Tool & Machine Co., Huntington, Conn., has been incorporated with authorized capital stock of $20,000. The incorporators are Frank E. Birchfield, Fred G. Bouteiller, both of Derby, and Harold E. Drew, Ansonia.

The A. C. Gilbert Co., New Haven, Conn., has increased its capital stock from $25,000 to $300,000.

Edgar T. Ward & Sons, 44 Farnsworth Street, Boston, have awarded a contract for an annealing building, 34 x 85 ft., one story.

The C. J. Root Co., Bristol, Conn., has increased its capital stock from $100,000 to $150,000.

The Arrow Electric Co., Hartford, Conn., is receiving estimates for an addition, 80 x 125 ft., three stories, also for a concrete coal pocket, 35 x 60 ft.

The Peck, Stow & Wilcox Co., Southington, Conn., has awarded a contract for an addition, 40 x 110 ft., one story.

The Armstrong Mfg. Co., Knowlton Street, Bridgeport, Conn., has awarded a contract for an addition about 100 ft. long.

The Gilbert & Barker Mfg. Co., West Springfield, Mass., has awarded a contract for an addition to its office building, consisting of an additional story to a building, 40 x 100 ft.

The Skinner Chuck Co., New Britain, Conn., has had plans prepared for an addition, 28 x 51 ft., one story, to be used as a hardening room.

Landers, Frary & Clark, New Britain, Conn., have awarded a contract for an addition, 45 x 225 ft., two stories.

Philadelphia

PHILADELPHIA, April 8.

The new machine shop to be erected by Hugo Bilgram, Philadelphia, at 1217-33 Spring Garden Street, will be three stories, 75 x 160 ft., and cost approximately $100,000.

The Philadelphia Roll & Machine Co., Twenty-fifth Street and Washington Avenue, operating a steel casting works, will build extensions, including a crane runway, to cost about $15,000.

The Schwarz Wheel Co., Margaret Street, Philadelphia, manufacturer of wheels and automobile parts, has filed plans for extensions to cost about $10,000.

George W. Smith & Co., Inc., 3907 Powelton Avenue, Philadelphia, operating a wood-working plant, has commenced the erection of a new factory on Forty-ninth Street, one story, 280 x 345 ft., to cost about $150,000.

Part of the main building and melting room at the Clark iron foundry, Thirty-fifth Street and Grays Ferry Avenue, Philadelphia, were destroyed by fire on March 30. The plant is operated by Alfred J. Clark and is working on Government contracts.

The Mauney Steel Co. of North Carolina has leased a five-story building at 237 Chestnut Street, Philadelphia, for a branch establishment.

A new one-story machine shop to cost $10,900 will be erected by the Link Belt Co., Nicetown, Philadelphia, on Hunting Park Avenue.

The Sterling Iron & Steel Co., North Tenth Street, Philadelphia, has commenced the erection of a three-story extension, 40 x 120 ft., to cost $38,000.

The Crescent Insulated Wire & Cable Co., Olden and Taylor streets, Trenton, N. J., is taking bids for the construction of a three-story reinforced-concrete addition, 80 x 100 ft.

The Panther Rubber Mfg. Co., Stoughton, Mass., has acquired property at the foot of Perrine Avenue, Trenton, for about $25,000 for a new branch plant. The present structure will be remodeled and new equipment installed. The company recently acquired at a receiver's sale the works of the American Rubber Mfg. Co.

John H. Mathis & Co., Camden, N. J., shipbuilders, have filed plans for the construction of a one-story plant, 60 x 207 ft., at Point and Erie streets, for the manufacture of aircraft.

The Appliance Sales Co., Williamsport, Pa., has been incorporated with a nominal capital of $9,000 to manufacture electrical appliances. J. P. Haag, Williamsport, is the principal incorporator.

A new one-story foundry to cost about $20,000 will be erected by the Carpenter Steel Co., Reading, Pa., at Exeter Street and the River Road. It has also awarded a contract for the construction of a one-story mill building, for furnace work, 85 x 115 ft., to cost $35,000.

Fire, April 2, destroyed part of the plant of the Marietta Casting Co., Lancaster, Pa., with loss estimated at $10,000. Rebuilding will commence at once.

The Goodrich-Lenhart Mfg. Co., Hamburg, Pa., has been incorporated with a capital of $25,000 to manufacture automobiles. W. Stewart Wray, Reading, is the principal incorporator.

The proposed new plant of the Grasselli Powder Co., Cleveland, to be erected at New Castle, Pa., will consist of eight individual units, each one story, with power plant for

works operation. The new plant is estimated to cost in excess of $750,000.

The Nickel Alloys Co., Hyde, Pa., is planning for the erection of a one-story addition, 140 x 240 ft., to be used as a tube mill, at a cost of about $150,000.

The new ordnance plant to be erected by the War Department at Middletown, near Harrisburg, Pa., will consist of 30 buildings, instead of 15, doubling the capacity of the plant. Major Gray is in charge.

The Brown Instrument Co., Wayne and Windrin streets, Philadelphia, has let contract to R. C. Ballinger & Co., 218 North Thirteenth Street, Philadelphia, for the construction of an addition to its factory to cost about $50,000. The site on Wayne and Roberts avenues adjoins the present building. The company is devoting its capacity largely to manufacturing pyrometers used in the heat treatment of munitions. Richard P. Brown is president; C. Stanley Huribut, vice-president; George W. W. Cornman, secretary, and John P. Goheen, assistant treasurer.

Baltimore

BALTIMORE, April 8.

The American Propeller & Mfg. Co., 233 East Hamburg Street, Baltimore, will build a two-story addition to its plant at Jackson and Gittings streets, 150 x 200 ft. and 18 x 50 ft., to cost $30,000.

The turbine room of the Wilmington Gas Co., Wilmington, Del., was wrecked on April 3 and the machinery damaged by an explosion.

The Automotive Tractor Co., Frederick, Md., is erecting an additional building, 30 x 75 ft., to permit of increased manufacturing facilities. It expects to put its plant in operation in two weeks. The company is in the market for tractor wheels, both front and rear. Louis A. Letherz is assistant manager.

The coreroom and foundry of the Kennedy Foundry Co., Charles and Wells streets, Baltimore, manufacturer of gray-iron castings, was partially burned March 30. Operations are being carried on, although with some inconvenience. Joseph P. Kennedy is president.

The Riter-Conley Co., Baltimore, has awarded contract for a two-story addition, 47 x 130 ft., at its ship works on Curtis Bay.

The Diffendall Tool Co., Hagerstown, Md., has been incorporated with a capital of $150,000 by Walter H. Diffendall, H. R. Warlock and S. Ennis.

The Autogenous Welding Machine Co., 1217 Maryland Avenue, Baltimore, has awarded a contract for a two-story addition, 60 x 150 ft.

The proposed new shipbuilding plant of the Curtis Bay Shipbuilding Co., Curtis Bay, is estimated to cost over $1,000,000. James H. Preston and W. Bernard Duke head the company.

The Atlantic & Pacific Safety Explosives Corporation, Washington, D. C., has changed its name to the National Explosives Corporation, and increased its capital from $1,500,000 to $4,000,000.

The Farm Equipment Co., Washington, D. C., has been incorporated in Delaware with a capital of $90,000 by Ennis M. and P. M. Nichols to manufacture farm machinery.

The Maritime Mfg. Corporation, Alexandria, Va., recently incorporated, is reported planning the erection of a firearms plant. Paul Lulaney, Southern Building, Washington, is secretary.

The Briggs-Shaffner Co., Winston-Salem, N. C., is planning a new three-story reinforced concrete machine shop, 100 x 150 ft., and a one-story foundry, 100 x 100 ft., to cost about $75,000.

The Leader Plow Works, Staunton, Va., has had plans prepared for a two-story addition.

The American Shipbuilding Co., Alexandria, Va., recently incorporated with a capital of $10,000,000, has awarded contract for its proposed new steel shipbuilding plant on a site of about 30 acres, at Jones Point, on the Potomac River, near Alexandria. The initial plant will include six shipways, a steel fabricating plant, 200 x 400 ft., and machine shop, 75 x 200 ft. It is said to have a contract from the Government for 12 vessels to cost $20,000,000. Colon H. Livingstone, Washington, is president.

The War Department, Washington, has awarded contract for about $800,000 for airplane works at Montgomery, Ala., West Point and Americus, Ga. The plants will consist of assembling and repair work, including machine, foundry and other shops, and with equipment are estimated to cost over $2,000,000.

The Morse Chain Co., Ithaca, N. Y., manufacturer of silent chain drives, etc., is said to be planning the construction of a branch works near Greensboro, N. C.

The Fougner Concrete Shipbuilding Co., 50 Pine Street, New York, is reported considering the construction of a shipbuilding works at Jacksonville, Fla., for the building of concrete-steel vessels. The company recently changed its name from the Fougner American Steel Concrete Shipbuilding Co.

Chicago

CHICAGO, April 8.

Nothing big has developed in the past week, and business has been light with sales confined to individual tools, mostly second-hand. Firms which make a specialty of handling used machines are finding it easier to acquire stock. On most small and medium-sized machines deliveries are good or fairly so. On some makes of new tools announcement has been made of a further advance in prices in the past week.

In last week's report the erroneous statement was made that the Corn Products Refining Co., Argo, Ill., was in the market for 300 tools. The company's list embraced only 30 tools.

It is understood that the Bettendorf Co., Bettendorf, Iowa, will take over a part of the Government work which the Standard Steel Car Co., Hammond, Ind., has under contract.

Very little in the way of new plant construction is reported. In the first quarter of 1918 building construction in Chicago was the lowest in both volume and money in more than 10 years. Only two large permits were issued in March.

The B. J. Regnell Co., 19 South La Salle Street, Chicago, has been awarded the general contract for two one-story factory buildings, 90 x 90 ft. and 80 x 200 ft., at Morgan and Thirty-seventh streets, Chicago, for the Joslyn Supply & Mfg. Co., to cost $30,000.

F. D. Chase, industrial engineer, 122 South Michigan Avenue, Chicago, has taken bids for a one-story shop, at Archer Avenue and Grove Street, Chicago, for the Garden City Spring Works, 2300 Archer Avenue. It will be of brick and steel and cost $12,000.

Armour & Co., Chicago, have been granted a permit to construct a one-story brick machine shop to cost $40,000. R. C. Clark is the architect.

The H. W. Horst Construction Co., Rock Island, Ill., has been awarded contract for the erection of four reinforced concrete factory buildings, 40 x 65 ft., 60 x 200 ft., 75 x 200 ft. and 80 x 200 ft., for Deere & Co., Moline, Ill. They are to cost $300,000 and be completed in about six months.

The Aurora Automatic Machinery Co., Chicago, a Delaware corporation, has filed notice of change of name to the Independent Pneumatic Tool Co.

The Gite Brothers Mfg. Co., Chicago, has awarded a contract for the erection of a new one-story machine shop, 125 x 125 ft., on Kilbourne Avenue, near Fifteenth Street, to cost about $35,000.

The Barker Cushion Tire & Rubber Co., South Park Avenue, Chicago, has awarded a contract for the erection of a two-story plant, 50 x 125 ft., at South Park Avenue and Eighty-first Street.

The Standard Forging Co., East Jackson Street, Chicago, has awarded a contract for a new engine house and other buildings at Indiana Harbor, Ind., to cost about $15,000.

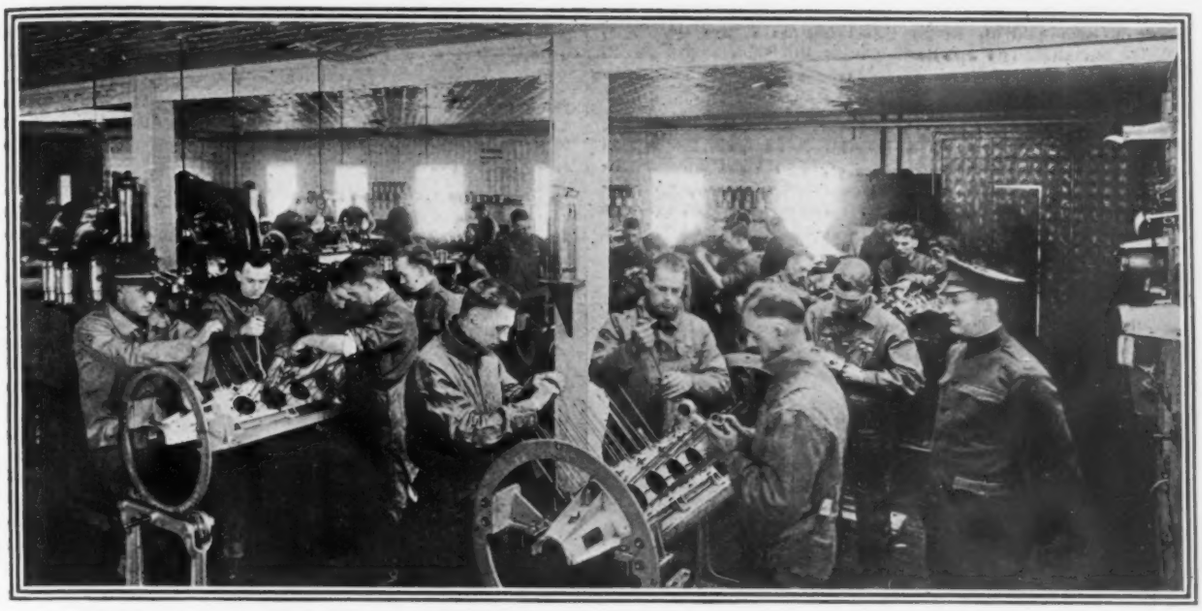
Before the close of the year, the Ilg Electric Ventilating Co., Whiting Street, Chicago, expects to build a four-story plant on Elston Avenue, to cost about $750,000. Preliminary plans are being prepared.

Milwaukee

MILWAUKEE, April 8.

The demand for machine tools continues active, and while no large orders have appeared the past week or 10 days, the total of bookings is such that it has been impossible to make any headway on deliveries. Inquiries have increased considerably in recent days, probably due to prospective Government business.

The shortage of skilled mechanics and common labor is growing. The report of the Milwaukee Free Employment Bureau for March shows that the demand for both classes has increased. Although common labor is offered from 30c. to 35c. per hr., only a part of the orders were filled. One manufacturer placed an order for 30 girls to work on drill presses and lathes at an average wage of 32½c. per hr., but it was only possible to fill one-half of the requirement.



Students of the Engineering School at Mineola, Long Island, N. Y., are taught aeroplane motor assembling. Photograph copyrighted by Committee on Public Information

The Wohlrab Gear Co., Racine Wis., has taken a long-term lease of the factory and shop group at Lake Avenue and Fourth Street, and after making extensive alterations, will move its plant from Corliss within 10 days. Since its organization the company has occupied part of the plant of the former Wisconsin Engine Co., Corliss.

The Falls Motors Corporation, Sheboygan Falls, Wis., has engaged A. C. Clas, architect, Colby-Abbot Building, Milwaukee, to prepare plans for a one-story brick and steel gas engine shop addition, 60 x 135 ft., costing about $25,000. The additional facilities are required to handle Government contracts for the manufacture of castings and engines for aircraft and army trucks. Angelo R. Clas is secretary and treasurer.

The Allis-Chalmers Mfg. Co., Milwaukee, is building a brick and steel forge shop, 150 x 200 ft., and 175 ft. high, for the production of propulsion shafts for Government shipbuilding. The new shop is being erected around the present forge shop and the extreme height is made necessary by the plan of handling shafts vertically instead of horizontally. An 80-ton electric traveling crane will be installed, with a runway of 200 ft. The shop is to be completed within 60 days.

The Tire Recruiting Machine Co., Milwaukee, has been incorporated with a capital stock of $50,000 by George J. Thust, superintendent of the Globe Seamless Steel Tubes Co., Milwaukee, and members of his family. It will make a line of equipment for the manufacture, repair and rebuilding of automobile tires designed by Mr. Thust and his son, Ray J. Thust.

The Reo Garage, 132 South Adams St., Green Bay, Wis., has plans for a brick and concrete machine-shop addition, 20 x 100 ft. D. G. Meyer is general manager.

The Chicago & Northwestern Railroad Co., Madison, Wis., sustained a loss of $15,000 by fire April 1 in its 8-stall roundhouse, machine shop and boiler room. The machine shop and equipment are practically a total loss. Replacement will be made at once.

The Kant Miss Spark Plug Co., Green Bay., Wis., organized some time ago with a capital stock of $100,000, has begun the production of gas engine ignition plugs in a building at Washington and Crooks streets. Additional equipment is being purchased. W. D. Cooke of Green Bay has purchased the controlling interest and is president and treasurer. B. E. Colburn, founder of the company, is vice-president and secretary and has charge of manufacturing operations.

The Modern Pattern Co., 126 Clinton Street, Milwaukee, will enlarge its plant to provide machine shop and boiler shop facilities by the erection of a two-story brick and steel building, 70 x 70 ft., on Clinton, near Lake streets, designed by M. E. Vierheilig, architect, 764 Thirty-second Avenue. George C. Kohlhardt is secretary and treasurer.

The International Oil Burner Co., Milwaukee, has been incorporated with a capital stock of $25,000 to manufacture oil-burning heating devices. The incorporators are A. J. McKerihan, Lyman G. Wheeler and Richard S. Witte.

The Standard Mfg. Co., Appleton, Wis., a wood-working interest, will erect a complete new factory group, 120 x 120 ft., of reinforced concrete and brick construction, with mill floors. Much new equipment, including electric motors, planers, etc., is being purchased. The project involves an expenditure of about $75,000. G. H. Schmidt is secretary.

The Lauchin Air-Starter & Tire Inflater Co., Green Bay, Wis., has been organized with a capital stock of $50,000 to manufacture a combination pneumatic starting device, designed by George Y. Lauchin. A plant will be erected. The company is purchasing materials for an initial production of 500 devices and is in the market for a small list of metal-working tools. Joseph F. Rothe, head of the Rothe Foundry Co., Green Bay, is president.

The West Bend Aluminum Co., West Bend, Wis., has awarded the general contract to the Northern Construction Co., Milwaukee, for a three-story building, 72 x 195 ft., and a one-story addition, 50 x 60 ft., costing $60,000 without equipment. B. C. Ziegler is secretary.

The Badger State Tanning Co., Sheboygan, Wis., has engaged Juul & Smith, architects, to prepare plans for a new power house, machine shop and garage of reinforced concrete and brick, 76 x 130 ft., part two stories and basement. Bids will be taken the latter part of April.

The J. C. Thielacker Co., Milwaukee, has been incorporated with a capital stock of $10,000 to manufacture architectural and ornamental iron work. The incorporators are Julius C. Thielacker, 937 Twenty-second Street; George G. Crombie, Jr., and Benjamin J. Sommers.

The Automatic File & Index Co., Green Bay, Wis., manufacturing steel and wood office equipment, has increased its capital stock from $25,000 to $150,000 and will enlarge its facilities. Two stories will be added to the present two-story main factory, 100 x 150 ft., and a four-story addition, 20 x 150 ft., also will be erected. Tentative plans have been completed. F. L. G. Straubel is president and general manager.

The Production Pattern & Equipment Co., Milwaukee, has been organized by Paul E. Keller, 2923 Brown Street, to establish a pattern works and factory equipment shop. The capital stock is $25,000. Otto Kolbitz and M. A. Keller are associated with Mr. Keller.

The I. B. Rowell Co., Waukesha, Wis., maker of farm implements and machinery, is enlarging its facilities to handle an increased volume of business.

The Milwaukee-Western Fuel Co., 14 Grand Avenue, Milwaukee, will take bids this week for the construction of a machine shop, garage and office building, 50 x 200 ft., two stories, of brick, steel and concrete, at its Canal Street dock. A small crane and a miscellaneous equipment will be required.

The Reliance Motor Truck Co., Appleton, Wis., expects to be ready for the reception of equipment in its new motor truck manufacturing plant by May 1. Production will start June 1. The company formerly was the Racine Motor Truck Co., Racine, Wis. At the annual meeting on April 4 Ira L.

Miller was re-elected president and other officers are as follows: Vice-president, A. K. Ellis; secretary and treasurer, T. M. Purtell. The directors include the officers and F. W. Grogan, G. F. McGillan, W. Harvey Kelley and George B. Barlow.

The West Allis Iron Works, Seventy-fifth and Elm streets, West Allis, has increased its capital stock from $25,000 to $75,000 and changed its corporate style to West Allis Foundry Co. to better designate its business. The company manufactures steel, semi-steel and die-steel castings. The plant is being enlarged and the facilities increased about 33 1/3 per cent. Leo Rehorst is secretary.

Detroit

DETROIT, April 8.

The munition contracts now being filled in Detroit are estimated at between $650,000,000 and $700,000,000. The recent contract to the Chalkis Mfg. Co., 66 Mack Avenue, Detroit, for 3-in. guns totals $8,000,000. The company was organized by Hugh Chalmers and W. P. Kiser, formerly of the Chalmers Motor Car Co. The Ford Motor Co., Detroit, is reported to be experimenting extensively on the production of rifles, and this may be another Detroit war industry within a short time. The skilled labor situation is serious. More than 20,000 trained men are lacking at the present time. Within a few weeks the shortage will be increased to 33,000 by the opening of the Dodge Brothers munition plant, and the Lincoln Motor Co., each of which will employ 5000 more skilled mechanics, and the Detroit Shell Co., which will employ 3000. Efforts by employers' associations and civic bodies have not relieved the situation.

Metal-working companies are extremely active. The demand for machine tools is more brisk. Construction work is gradually gaining momentum. Jobbers report more inquiries for machine tools than have been received for several weeks. Building permits for March were $1,100,830, a big increase over February.

The plant of the Wilt Engineering Co., Conant Road near Mount Elliott Avenue, Detroit, has been purchased by John F. Dodge, of Dodge Brothers. The property consists of approximately five and one-half acres of land, on which is a one-story brick and glass factory, 50 x 275 ft. Considerable machinery and general equipment is included in the purchase.

The Paige-Detroit Motor Car Co., Detroit, is organizing a separate motor truck department, and is equipping a complete truck factory, comprising several buildings in addition to those now included in the Paige group. The new truck plant will be entirely distinct from the passenger-car factory.

The Murphy Iron Works, Detroit, has just completed a pattern and wood-working shop at the foot of Walker Street, 80 x 80 ft., of mill construction, costing about $25,000.

The National Twist Drill & Tool Co., Detroit, has erected a brick, steel and reinforced concrete four-story addition to its factory on Brush Street.

The Buhl Malleable Iron Works, Detroit, has let contracts for additions and alterations to its core shop.

The Ford Motor Co., Detroit, has let contracts for several aeroplane factories to be erected on Oakland Avenue.

The Commerce Body Co., Ann Arbor, Mich., formerly the Porter Mfg. Co., has recently extended its business to include on a broader scale the manufacture of motor truck and trailer bodies. The plant has a floor space of 50,000 sq. ft.

The Caille Perfection Motor Co., Detroit, is making a new rowboat engine to retail at less than $50. It is planned to produce several thousand this year.

It is reported that tests on a steel truck wheel, the invention of M. Lachman, president of the Universal Electric Welding Co., 30 East Forty-second Street, New York, are being conducted at the plant of the Hayes Wheel Co., Jackson, Mich., and if satisfactory it is probable that the manufacture of the wheel will be taken up in that city. In this event additions to the Hayes Wheel Co. plant will be necessary.

The Peerless Fixtures Co., Marshall, Mich., will build an addition to its factory, 60 x 110 ft., two stories. Ground will be broken at once. R. F. Grant is general manager.

The Buick Motor Co., Flint, Mich., has been granted a permit for a new factory building to cost $68,000.

The Copeman Laboratory Corporation, Flint, Mich., has plans for a building to cost approximately $8,500. Machinery from the Detroit branch will be installed to press out metal grease.

The Michigan Central Railroad Co. is tearing down its old roundhouse on the west side, Bay City, Mich., in order ultimately to erect a car repair shop on its site.

The Hackett Motor Co., Grand Rapids, Mich., has started work on their new unit in Wyoming Park, 70 x 500 ft., one and two stories, to cost between $35,000 and $50,000. It is to be completed within 60 days. It is proposed to double the capacity of the plant within six months.

The D'Arcy Spring Co., Kalamazoo, Mich., has purchased the business, good will and equipment of the Perfection Coil Spring Co., Jackson, Mich. The equipment is being moved to Kalamazoo for installation in the D'Arcy plant. The additional machinery will enable it to increase its output by 15 per cent.

The Newaygo Portland Cement Co., Newaygo, Mich., will install a plant for the recovery of waste potash for use as fertilizer. The installation will cost about $75,000 and work upon it will begin without delay. J. B. John is vice-president and general manager.

A company headed by G. F. Crippen, Ypsilanti, will locate in Mount Pleasant, Mich., for the manufacture of a bean picker. The board of trade has offered a site and a building, and machinery will be shipped at once.

In order to increase its capacity the Smith Matthews Foundry Co., 650 Bellevue Avenue, Detroit, has installed additional equipment for the manufacture of heavy castings.

The Leonard Tractor Co., Jackson, Mich., has closed contract with the Leonard Tractor Co. of Canada, Ltd., Montreal, by which 3000 tractors will be manufactured by the Canadian company on a royalty basis for the Dominion Government. The Michigan company has secured a site in Kalamazoo upon which it will eventually erect a plant. H. M. Leonard is president and C. W. Martin is secretary and treasurer.

The controlling interest in the American Brass Novelty Co., Grand Haven, Mich., manufacturer of automobile body and hood hardware, etc., has been purchased by Charles D. Reeve, vice-president and general manager of the Grand Rapids Brass Co., and D. J. Gorman, Eastern representative of the Keeler Brass Co.

Cleveland

CLEVELAND, April 8.

The market has been rather quiet the past week. Buying for Government work was confined mostly to equipment for making motor truck parts. There is a heavy demand for vertical drilling machines and small boring mills for truck work. The Grant Motor Car Co. and the Templar Motors Corporation, Cleveland, are in the market for some machinery and the Standard Parts Co. is buying additional equipment. The scattered demand for single machines holds up well, but no new inquiries of any size developed during the week. Deliveries on some lines are again growing tighter. Boring mill manufacturers are now 8 to 12 months behind on shipments, but some second-hand machines are being found by manufacturers who wish immediate deliveries. The demand for cranes continues active, but orders are mostly for single installations.

The Shehan Tool Co., Cleveland, has been organized to bring out a self-opening die head and collapsible tap, and has established a plant in the Perkins Power Building. D. J. Champion, Champion Rivet Co., is president; Thomas Shehan, vice-president; Thomas Ferry, Ferry Cap & Set Screw Co., general manager, and M. B. Daly, secretary and treasurer.

The Cleveland Hardware Co., Cleveland, is planning the erection of an addition, 40 x 200 ft., to its machine shop.

The Shaw-Kendall Engineering Co., Cleveland, will erect a one-story factory, to cost approximately $10,000.

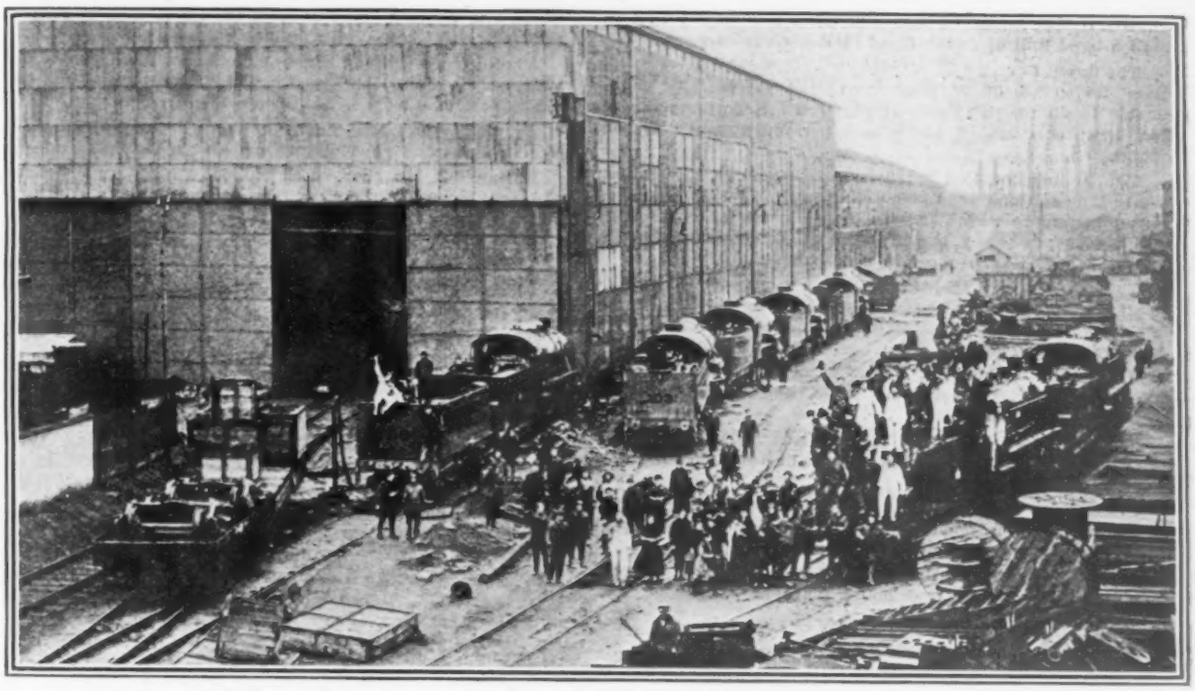
The Kilby Mfg. Co., East Forty-sixth Street and Lakeside Avenue, Cleveland, will enlarge its plant by the erection of a foundry addition, 57 x 220 ft.

The city of Cleveland is planning the erection of a blacksmith shop and garage at East Seventy-third Street and Dill Avenue. It will be one-story and cost about $16,000.

The American Welding & Mfg. Co., Warren, Ohio, incorporated with a capital stock of $200,000, will shortly begin the erection of a plant near that of the Warren Tool & Forge Co. The incorporators include F. D. Templeton, C. R. Siegfried, O. R. Grimmessey, R. B. Wick and D. A. Geige.

The American Clay Machinery Co., Bucyrus, Ohio, has nearly completed one building, 125 x 400 ft., for its Mansfield, Ohio, plant, and it is announced will shortly begin the erection of another of the same size.

The McKinnon Iron Works Co., Ashtabula, Ohio, will shortly begin the erection of a foundry, 35 x 52 ft.



United States Locomotive Assembling Yards in France. Photograph taken Feb. 14 and copyrighted by Committee on Public Information

Cincinnati

CINCINNATI, April 8.

Government orders for machine tools are still heavy and confined to the larger machines. Quite a number of portable electric drilling machines, however, have been bought recently by different departments. Automobile manufacturers are not buying any machine tools, even for replacement, except in cases where war contracts are in hand. Makers of metal punching and shearing machines have all the business they can take care of, and some have sufficient orders to carry them through the next four or five months.

Compared with other parts of the country the local labor situation is fairly satisfactory. The bonus systems in most shops appear to be successful and are said to contribute materially to the mutual welfare of employee and employer. Employers consider it unwise on the part of outside manufacturers to make a campaign to induce workmen to migrate to other centers. It is thought that the Government should prohibit plants advertising for men outside of their own zones. Practically all local manufacturers are busy with war work of some kind, and their speeding up program will be greatly disarranged if working forces are depleted.

Kirk & Blum, Cincinnati, sheet metal workers, have acquired the former plant of the Oesterlein Machine Tool Co., in the Camp Washington district, and will commence the removal of their equipment from the present plant at York Street and Western Avenue within the next 30 days. A branch plant has been in operation on Freeman Avenue, and the machinery in this will also be removed to the new building. The company will add to their line of sheet metal specialties, including work for automobile manufacturers, and the present capacity will be more than doubled.

The Edwards Mfg. Co., Cincinnati, has obtained the plant of the Louis Lipp Co. at Winton Place, which will be equipped for the manufacture of rolling steel doors, steel lockers and other metal specialties. The main building is 50 x 145-ft., two stories, with two wings, each one story, 60 x 600 ft. The Lipp company, which manufactures sanitary supplies, expects to liquidate its business at an early date.

The new plant of the Liberty Machine Tool Co., Hamilton, Ohio, will be ready for occupancy before May 1. Practically all the necessary equipment has been purchased. A. R. McCann is general manager.

The Bentel & Margedant Co., Hamilton, whose plant was recently purchased by the Long & Allstatter Co., announces that it has acquired a 5-acre site on Mill Road on which it will erect a plant for the manufacture of wood-working machinery. A part of the new building will be occupied by the Central Foundry Co., a subsidiary.

Tentative plans are under way by the Hamilton & Rossville Hydraulic Co., Hamilton, to construct a large power plant in a suburb of Hamilton. Stone & Webster, engineers, New York and Chicago, have the plans in charge.

The Dayton-Ohio Production Co., Dayton, was recently formed by D. W. Morgan and others. It is reported that the company has leased the forging department of the Barney & Smith Car Co., and will begin work on a large shell contract at an early date.

The Smith Gas Engineering Co., Lexington, Ohio, advises that its new plant at Moraine City, a suburb of Dayton, will be its main factory, where its general offices will be established. The Lexington plant will continue in operation.

The Gem City Instrument & Tool Co., Dayton, has been incorporated with $10,000 capital stock by Lee S. Scheid and others.

The Ignition Plug Co., Dayton, has been incorporated with $15,000 capital stock to manufacture spark plugs. W. T. O'Neill, Reibold Building, is one of the principal incorporators.

The Ohio Malleable Iron Co., Columbus, Ohio, has awarded contract for an addition to its plant on Curtis Avenue.

It is reported that the Columbus Chain Co., Columbus, contemplates installing considerable equipment in its plant at an early date.

The Columbus Tractor Co., Columbus, has been incorporated with $1,000,000 capital stock by Fred W. Miller and others, and has absorbed the McIntyre Mfg. Co., maker of farm tractors. The present output will be greatly increased.

The Central South

LOUISVILLE, KY., April 8.

The general situation shows very little change. An active demand is noted for boilers, mining machinery, oil well equipment and also for some ice machinery. No improvement has been shown in the gray-iron casting situation, most foundries being very short of business. The coal situation is much easier, and prices on all eastern Kentucky grades have been reduced about twenty cents a ton throughout the zone. Skilled labor for shops and construction work is far below demand.

Kentucky distillers have offered the use of the milling divisions of their plants to the Government for manufacturing corn meal. There are 167 plants with milling machinery capable of turning out 24,000 bu. of corn and rye flour per hour. The prohibition situation is such that many of these distilleries are being dismantled, resulting in a fairly large supply of good second-hand boilers, engines, etc., being placed on the market.

The Colonial Lumber Co., Bearden, Tenn., has asked for prices on machine-shop equipment, including a 24-in. to 30-in. x 10 ft. lathe; also a good-sized planer, shaper, drill press, etc., either new or second-hand.

The Tug River Lumber Co., Whitesburg, Ky., has pur-

chased timber boundary and will build a tramway and install a band mill of 30,000 ft. of lumber daily capacity.

The Love Foundry & Machine Co., Winchester, Ky., has been forced to discontinue operations temporarily, being unable to obtain shipments of pig iron. Reports to the effect that the company had closed permanently are without foundation.

The Foundation Co., 233 Broadway, New York, is investigating conditions at Louisville, Cincinnati and Paducah, Ky., planning to install a plant there to manufacture wood and steel ship parts, and light draft vessels, river boats, barges, etc. F. W. Adgate is manager.

The Embry Box Co., Louisville, has purchased an adjoining building, which will be remodeled into a wire-bound box manufacturing department. Some machinery will be required.

Charles A. McLean, Norfolk, Va., is in the market for a 100-ton hydraulic wheel press with capacity for handling 36-in. to 40-in. carwheels.

The Planters Oil, Mill & Gin Co., Kosciusko, Miss., is in the market for a 3-drum hoisting engine for unloading coal cars.

Prices have been asked on a 100 to 150-hp. boiler and 50 to 75-hp. engine in good condition, for immediate shipment to the Young-Johns Lumber Co., Hurtsboro, Ala.

The Chesapeake & Ohio Railroad is planning the rebuilding of its engine and boiler plant at Maysville, Ky., recently damaged by fire.

Indianapolis

INDIANAPOLIS, April 8.

The Teetor-Hartley Motor Corporation, Hagerstown, Ind., has been incorporated with $1,000,000 capital stock to manufacture motors and metal products. The directors are Charles N. and Ralph R. Teetor, Charles Cassel, E. Ralph Himelick, Allen Wiles, Joseph A. Braun and Frank M. Tatman.

The Indiana Piston Ring Co., Hagerstown, Ind., has been incorporated with $100,000 capital stock to manufacture metal products. The directors are John H., Charles N., Joseph C., Frank and Henry C. Teetor, Henry W. Keagy and Blair Hartley.

Work has been started on an addition to the plant of the T. W. Warner Auto Parts Co., Muncie, Ind., that will add one-third to its capacity and give employment to 200 additional workmen. The company has large Government contracts.

The C. Fussner Mfg. Co., Indianapolis, has been incorporated with $50,000 capital stock to manufacture machinery. The directors are Charles J. and Peter F. Fussner and Harry B. Cobb.

The International Electric Co., Indianapolis, has been incorporated with $20,000 capital stock to manufacture electrical machinery. The directors are Gordon B. Tanner, Fred Sterling, Jr., and M. H. Tanner.

St. Louis

ST. LOUIS, April 8.

Harry Holmes, Harrisburg, Ark., is in the market for machinery for a cotton gin, flour mill and ice plant, together with power plant equipment for operating.

A. Y. Sturdivant, Whitehead, Miss., will re-equip a cotton gin, recently wrecked by an explosion and is in the market for equipment.

B. F. Ryon, Texarkana, Ark., will equip an electric light and power plant at Delight, Ark., and is receiving bids for machinery.

The Oklahoma Public Service Corporation, Broken Arrow, Okla., will equip an electric light and power plant.

The Oklahoma Standard Producing & Refining Co., Oklahoma City, Okla., incorporated by F. R. Sims and W. W. Graves and others, with a capital of $300,000, will equip a refining plant.

The Thurman-Davis Grain Co., Neosho, Mo., will erect a grain elevator to replace one recently burned with a loss on equipment of $65,000.

The Fort Scott Sorghum Co., Fort Scott, Kan., will equip a branch factory at Pine Bluff, Ark., requiring about $75,000 of machinery.

The Skinner Brothers Mfg. Co., St. Louis, has been incorporated with a capital stock of $150,000 to manufacture ventilating equipment. The incorporators are Fred A. C., Charles N. and Merrill G. Skinner.

The Lubrite Refining Co., Nebraska Building, Tulsa, Okla., will equip a plant in East St. Louis with a daily capacity of 1000 bbl. Stills, tanks, pumps, etc., are wanted.

The Jahncke Shipbuilding Corporation, Madisonville, La., will equip a 10,000 ton dry-dock, including pumps, etc. Lee Jahncke, New Orleans, La., is president.

Jennings, La., will equip a sewage disposal plant, an electric light and power plant and an ice factory.

Springfield, Mo., has voted $1,500,000 for the construction and equipment of a waterworks plant. O. D. Chrisman is city engineer.

A. B. Hugo, Enid, Okla., is reported in the market for an 8-in. centrifugal sand pump.

Blackwell, Okla., has voted $82,500 for additional equipment for its electric light and power plant.

The Leahy Boiler Works, Tulsa, Okla., has been incorporated with a capital stock of $25,000 to manufacture boilers, tanks, etc. R. Leahy, R. J. Justice and H. O. Bland are interested.

The Acme Tank Co., Tulsa, Okla., has been incorporated with a capital stock of $100,000 by E. L. Maddox, W. A. Sipe, Jr., and H. B. Maddox to manufacture steel tanks, etc.

The Independent Refinery Co, Oklahoma City, Okla., capital $300,000, J. W. Bouse, W. M. Weber and G. L. Buck interested, will equip a refining plant, and is in the market for the machinery.

The Kiowa Ice, Light & Water Co., capital $50,000, Kiowa, Okla., L. T. Sammons and Milo T. Crane and others of McAlester, Okla., interested, will equip ice making and electric light plants.

Doullut & Williams, New Orleans, have plans for the equipment of a shipyard at New Orleans.

A plant for steel and wooden ships will be equipped at New Orleans by the National Shipbuilding Co., Orange, Tex.

The Gulf Shipbuilding Co., Pascagoula, Miss., has been incorporated with a capital stock of $100,000 by A. F. Dantzler, H. H. Colle and B. G. Boag and will equip a plant.

The Yarbrough Co., Powhatan, La., is in the market for Scotch marine boilers and other power plant equipment.

The Kewanee Boiler Co., 1420 McGee Street, Kansas City, Mo., is in the market for 20,000 lb. traveling cranes.

The Combel Hardware Co., Biloxi, Miss., has been incorporated with a capital of $20,000 to manufacture hardware. W. O. Clark, L. F. Janin, Jr., and U. S. Joachim, Biloxi, are the incorporators.

The plant of the Marvin Planing Mill Co., Ella and Morton avenues, St. Louis, was destroyed by fire March 22, with loss estimated at $90,000. It was engaged on Government work and, it is said, will be rebuilt.

Texas

AUSTIN, April 6.

It is announced that the Prairie Oil & Gas Co., Houston, will construct an oil refinery on a site of 400 acres, recently purchased, bordering on the ship channel and will lay a pipe line from Cushing in Oklahoma to the site of the proposed refinery. Wharves and other deep water facilities on the ship channel will be constructed. An appropriation of $30,000,000 has been made to cover the costs. The company will also lay a branch pipe line from Ranger to Brownwood and install pumping stations.

The Farmers Gin Co. Lockhart, has been incorporated and will construct a cotton gin to cost $15,000. J. M. Young is a stockholder.

The Emergency Fleet Corporation has awarded a contract to the Beaumont Shipbuilding & Dry Dock Co., Beaumont, to construct a 3200-ton marine railroad to cost $200,000, to facilitate the completion of wooden ships now under construction.

California

SAN FRANCISCO, April 2.

Demand for machinery remains in excess of the supply. This is particularly true regarding the larger types of equipment. Practically every shop and foundry on the Coast is engaged in Government work. These orders are passed down from the shipbuilding plants to the larger shops and through these to the smaller ones. A local job which has no bearing on Government work has small chances of acceptance in a shop that is equipped with anything like modern machinery. This is working a hardship in many cases. One of the severe sufferers from the present situation is the planing mills. Many of these have closed down, owing to the building depression, and most others are running on short time. New shipbuilding plants continue to be

started, nearly all with Government contracts already assigned, and the older yards are constantly being improved.

The Moore Shipbuilding Co., Oakland, is about to expend $500,000 for speeding up its output of ships. The largest single improvement will be a new boiler shop 300 x 400 ft., to cost $50,000. This work was ordered by the Federal Shipping Board, under the direction of which the company is preparing to manufacture boilers for installation in wooden hulls at other plants. Work is being rushed on three 9400-ton freighters. The keels were laid March 14 and the vessels will be launched about July 4.

The Union Iron Works, Alameda branch, launched the 11,700-ton freighter Liberator this week and a sister ship will be launched early in April.

The Pacific Coast Shipbuilding Co., Bay Point, is ready to start building as soon as steel plates arrive. More machinery arrived this week, including a 36-in. and 48-in. punch, a horizontal punch and bending machine, a double ended Doty punch of large capacity, portable counter-sinking machinery, etc.

The Hall-Scott Motor Co., Berkeley, has begun construction work on additions recommended by the Government. The first unit added will cost about $50,000. As soon as completed the plant will be ready to manufacture Liberty motors and other products for Government use.

The Standard Oil Co. of California, San Francisco, has acquired 243 acreage additional at Richmond, to be used partly for additions to its Richmond oil refinery and partly for the development of a water terminal enabling steamers to dock at the works.

The Hewitt-Ludlow Motor Truck Co., San Francisco, has been amalgamated with the Ralston Iron Works. A new company has been formed, of which H. J. Ralston is president and W. A. Hewitt, vice-president. The truck will be made at the Ralston Iron Works.

C. A. Perkins, San Francisco, has been awarded contract to erect a frame machine shop and an addition to the pattern building of the Skandia Pacific Oil Engine Co., Oakland, to cost $18,000.

The Pacific Northwest

SEATTLE, April 2.

The demand for machinery in this section is unequalled and business is limited only by the supply and the difficulties in obtaining shipments. The Government program has caused a remarkable demand for logging machinery, and plants engaged in that line of manufacture are rushed to capacity. With new equipment scarce and hard to obtain, second-hand engines and smaller machines are picked up rapidly. The demand for airplane spruce and ship timbers has caused many new plants to spring up and has opened up logging work in a way never experienced before.

The car shortage continues extremely serious and nothing except the sending of several thousand empty cars to the north Pacific Coast will relieve the acute situation. Mills are getting less than 25 per cent. of the necessary number of cars. The labor situation is fairly satisfactory, although there is a noticeable scarcity of skilled mechanics. In one or two branches it has been impossible to secure a sufficient number of employees.

The Olympic Steel Works, Seattle, has increased its capital stock from $20,000 to $25,000.

The Skinner & Eddy Shipbuilding Corporation, Seattle, will begin work immediately on the proposed two-story foundry and machine shop, 165 x 450 ft., to cost $70,000.

D. W. Hartzell, Inc., Seattle, recently leased the shipbuilding and repair plant of the Winslow Marine Railway & Shipbuilding Co. at Eagle Harbor, which it will enlarge for the construction of ocean-going wooden steamers, and later a steel shipbuilding department will be added. The plant will continue to handle repair work, and will also be utilized for the installation of machinery in wooden ships now under construction in Puget Sound.

The Pacific Marine Iron Works, Portland, in operation since Jan. 1, is constructing four boilers each month and a large marine engine every six weeks. The equipment will be placed in the 8800-ton steel and wooden vessels now being built in Portland.

The Bay City Shipbuilding Co., Bay City, Ore., has been incorporated for $150,000 by H. E. Hartline, Scott Bozorth and E. A. Baker, and will establish a small plant in that city.

The Seaborn Shipyards, Tacoma, Wash., will erect a machine shop to cost $15,000. Ships which the company is building will be outfitted at the plant.

The Willamette Iron & Steel Works, Portland, has under contract more than 100 scotch marine boilers, costing about $3,000,000. In future, the plant will build boilers only for the Northwest Steel Co., Albina Engine & Machine Works, and the Emergency Fleet Corporation. No new contracts will be placed. The company installs all the machinery in the vessels under construction by the Northwest Steel Co.

The Puget Sound Traction, Light & Power Co., Seattle, contemplates the immediate construction of a one-story addition to the Georgetown power house, to cost $30,000.

The Washington Tire & Rubber Co., Spokane, Wash., has been organized with a capital of $1,500,000, and will build a factory for the manufacture of automobile tires, tubes and accessories at a cost of $150,000. A. G. Hanauer is president and T. S. Lane vice-president. A three-story steel and concrete building, 100 x 300 ft., will constitute the first unit of the plant. A complete service station will be built adjoining.

The Astoria Marine Iron Works, Astoria, Ore., which recently received a Government contract for the installation of equipment in 30 Government vessels to be built in the Columbia River district, plans the erection of additional machine shops and a foundry. A forge shop will also be built, and considerable equipment installed.

The Puget Sound Machinery Depot, Seattle, has leased the plant of the National Iron Works, Spokane, Wash., which it will use for filling war orders. Engines and auxiliary machinery for the ships now under construction will be built at the Spokane plant. New machinery will be added.

The Hallidie Machinery Co., Spokane, which purchased the plant of the Sammis Monumental Works, Spokane, has moved into its new quarters. The company recently purchased $75,000 worth of new machinery, which will be further augmented. Contracts aggregating $1,500,000, will keep the plant busy for two years.

The Marsh & Allard Iron Foundry, Tacoma, Wash., began operation March 1 in its plant at 1161 Minneapolis Avenue. It makes a specialty of gray iron ship materials and castings. A blast furnace is under construction.

Government Purchases

WASHINGTON, April 8.

Bids were received by the Bureau of Supplies and Accounts, Navy Department, Washington, April 2, for supplies for the naval service as follows:

Schedule 3789½, Steam Engineering.

Class 256, Philadelphia—Pipe expanding and flanging machine—Bid 103, $4,073.

Schedule 3791½, Steam Engineering.

Class 258, Philadelphia—Sensitive drill—Bid 36, $202.50; 102, $200; 122, $397; 138, $195; 199, $511.

Class 259, Philadelphia—Sensitive drill—Bid 36, $146; 102, $144.50; 122, $130; 138, $138; 199, $409.

Class 260, Philadelphia—Radial drill—Bid 102, $2,041.30, $1,272.04; 122, $2,701; 137, $1,810; 138, $1,795; 187, $2,059; 199, $1,830; 215, $2,043; 245, $2,049.

Class 261, Philadelphia—Radial drill—Bid 102, $2,041.30; 122, $2,718; 137, $1,810; 138, $1,810; 187, $2,069; 199, $1,840; 215, $2,043; 245, $2,161.

Class 262, Philadelphia—Radial drill—Bid 102, $3,450; 137, $3,290, $3,380; 187, $3,407; 199, $2,842.

Class 263, Philadelphia—Upright drills—Bid 102, $550; 138, $565, $580; 187, $1,041; 199, $1,068; 215, $737.

Schedule 3792½, Steam Engineering.

Class 264, Philadelphia—One cold metal saw—Bid 102, $1,771; 122, $1,767, $1,811; 137, $2,230; 139, $2,170, $1,220, $3,335, $1,860, $3070; 199, $1,330; 215, $1,672.

Class 265, Philadelphia—Cutting band saws—Bid 119, $1,170.

Class 266—Bid 102, $289; 122, $551; 138, $270; $221; 179, $239.25; 199, $422; 245, $371.

Class 267—Bid 102, $282; 122, $397; 138, $250, $220; 179, $211.40; 199, $310; 245, $361.

Schedule 3796½, Steam Engineering.

Class 301, Philadelphia—Punch and shear—Bid 89, $6,089; 102, $4,183.20; 122, $4,903; 124, $3,950; 137, $4,675; 163, $5,275; 232, $4,803; 237, $5,710.

Class 302, Philadelphia—Power shear—Bid 102, $2,081.30; 122, $2,029; 137, $1,760; 163, $1,850; 232, $1,523.

Class 303—Bid 122, $1,662; 168, $2,300 and $4,100.

Class 304—Bid 89, $2,520; 102, $2,915.70; 122, $2,880; 137, $3,370; 215, $1,730.

Schedule 3797½, Steam Engineering.

Class 305, Philadelphia—Crank shaper—Bid 102, $2,114; 122, $1,926; 137, $1,820; 138, $1,465; 199, $1,365; 245, $1,672.

Class 306, Philadelphia—Motor-driven shaper—Bid 102, $1,546.20; 122, $1,435; 137, $1,165; 138, $960; 199, $1,130.

Class 307, Philadelphia—Heavy-duty shaper—Bid 102, $1,546.20; 122, $1,425; 137, $1,485; 138, $1,245; 199, $1,618; 245, $1,341.

Schedule 3798½, Steam Engineering.

Class 308, Philadelphia—Heavy plain milling machine—Bid 138, $2,920; 187, $2,695.

Class 309, Philadelphia—Milling machine—Bid 187, $3,578.

Class 310, Philadelphia—Milling machine—Bid 187, $4,188.

The names of the bidders and the numbers under which they are designated in the above list are as follows:

Bid 36, James Clark, Jr., Electric Co.; 89, Hilles & Jones Co.; 102, Kemp Machinery Co.; 103, Lovekin Pipe Expanding & Flanging Machine Co.; 119, Monarch Machinery Co.; 122, Manning, Maxwell & Moore, Inc.; 124, Massillon Foundry & Machine Co.; 137, Niles-Bement-Pond Co.; 138, D. Nast Machinery Co.; 139, Newton Machine Tool Works; 163, Henry Prentiss & Co., Inc.; 168, Quickwork Co.; 179, W. Robertson Machinery & Foundry Co.; 187, W. E. Shipley Machinery Co.; 199, Sherritt & Stoer Co.; 215, Vandyck-Churchill Co.; 232, Williams, White & Co.; 237, Bertsch & Co.; 245, Fairbanks Co.

NEW TRADE PUBLICATIONS

Pneumatic Riveting Machines.—Vulcan Engineering Sales Co., 1765 Elston Avenue, Chicago. Catalog No. 3. Illustrates and describes the various types of pneumatic riveting machines built by the Hanna Engineering Works. The machines covered include some for fabricating structural shapes and forms for shipbuilding as well as others for use in automobile plants and boiler, tank and locomotive shops. Tables showing capacities, dimensions, weights, etc., are included.

Bolts.—Kirk-Latty Mfg. Co., Cleveland. Catalog No. 18. Describes an extensive line of bolt, nut and rivet products. For the most part a pair of facing pages is given to each particular line with illustrations on one and dimension and price tables on the other. A thumb index is employed to facilitate ready location of any desired product.

Motor-driven Woodworking Machines.—Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Circular. Gives views of motor-driven woodworking machines and representative installations. The advantages of motor drive, such as increased production, better light, greater safety, higher efficiency, etc., are explained followed by a description of the motors designed for operating this class of machinery. A representative plant is illustrated and described, and a number of tables of useful information are included.

Countershafts.—Foster Machine Co., Elkhart, Ind. Catalog. Mentions a countershaft of the expanding friction ring type that has been developed for driving all kinds of machinery. The construction of the countershaft is given in some detail, the text being supplemented by a number of illustrations. Dimension tables and diagrams and an illustrated list of repair parts are included.

Steel Products.—W. J. Crouch Co., Inc., 253 Broadway, New York. Pamphlet. Treats of the service performed by this company in the exporting of American steel products. The lines covered include structural, shipbuilding and railroad material and wire and tube mill products. Each line is given a full page with a symbolic illustration and lists of the various products covered by each. Articles descriptive of the service and facilities of the company are included.

Grey-Iron Castings.—Stroh Casting Co., Detroit. Circular. Relates to the precautions taken to secure uniform grey-iron castings which is provided by a laboratory that analyzes all the materials used and a daily analysis of the heats. An illustration of a portion of the laboratory is included.

Electrical Heating.—Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Circular. Describes the progress of the electric heating of japanning, drying and baking ovens. An article giving the general considerations in favor of this method of heating is included together with detailed information on the calculation of the amount of heat required to raise the temperature of the work and that of the oven walls as well as the losses from the external surface of the oven.

Lubricant Pump.—Fulfo Pump Co., Cincinnati. Folder. Deals with the various essentials of a pump for handling coolant and lubricants which include the supply of an ample volume of liquid, instant pumping as soon as the machine starts, freedom from clogging and long life. The ways in which the pump meets with all of these essential requirements are illustrated and a number of testimonial letters are included.

Circuit Breakers.—Automatic Reclosing Circuit Breaker Co., Columbus, Ohio. Bulletin No. 30. Gives a general description of the construction of an automatic reclosing circuit breaker and a line of relays which have been developed for the protection of direct-current circuits. The theory upon which the breaker operates is discussed at some length and a number of applications are described. The different arrangements of breakers that can be furnished are illustrated and briefly described and a number of views of installations are included.

Punches and Dies.—Cleveland Steel Tool Co., 660 East Eighty-second Street, Cleveland. Catalog No. 7. Relates to an extensive line of structural and plate workers' tools which includes punches, dies, chisels, coupling nuts and rivet sets and tools. The catalog is divided into sections each dealing with one particular line and there is practically no text, the story being told by a series of diagrams showing the various shapes that can be supplied. A list of prices and dimensions of the standard punches and dies is included.

Crank Shaping Machine.—Columbia Machine Tool Co., Hamilton, Ohio. Circular. Describes a heavy-duty crank shaping machine equipped with a special driving mechanism. The various parts of the machine are briefly described, separate paragraphs being given to each. One of the special features of the machine is the use of a feed box providing eight changes secured through a small handle. An illustration and condensed specification tables of the machine which was illustrated in THE IRON AGE, Aug. 2, 1917, are included.

Charging Machines and Manipulators.—Wellman-Seaver-Morgan Co., Cleveland. Bulletin No. 7. Treats of a line of steel plant equipment which includes charging machines for open-hearth furnaces and manipulators for wheel blanks and tire blooms. Brief descriptions of the different types of charging equipment that can be supplied are presented with illustrations and a partial list of users of the equipment is included. Mention is also made of the facilities possessed by the company for designing and building standard and special steel equipment as well as planning the layout of complete plants.

Portable Tiering Machines.—New York Revolving Portable Elevator Co., 343 Garfield Avenue, Jersey City, N. J. Calendar hanger measuring 9¼ x 13 in. Shows the various ways in which the Revolvator, which is the company's portable tiering machine, can be used to save labor, time and space. This is illustrated by a series of six illustrations showing the piling of bales in warehouses and freight cars, the loading of trucks, as an aid in overhead drilling and erecting overhead motors and in handling barrels. The pad is of the customary 3-months type, (the dates for the present month being printed in larger and heavier type in the center flanked by those of the preceding and succeeding months in the smaller and lighter type.

Cold Drawn Steel.—Peerless Drawn Steel Co., Massillon, Ohio. Weight book. Contains a number of tables of weights of steel bars, strips and plates. These give the weight of the shapes in all the common lengths in feet, and by a little additional calculation the weights of odd lengths composed of feet and inches can be secured. The standard classification of extras on hot rolled steel bars and strips is given, and a number of tables of useful information are included.

Industrial Lighting.—Cooper Hewitt Electric Co., Eighth and Grand streets, Hoboken, N. J. Bulletin No. 80. Comprises a study on selection of a system of illumination designed to secure the maximum production from the equipment and safety for the operators. The question is gone into at some length from the standpoints of intensity of illumination, cost, safety and types of lighting units. A number of views of actual installations and diagrams showing arrangement of lighting in industrial plants are included.

Vertical Drilling Machine.—W. W. Machine Works, Chicago. Stocker-Rumley-Wachs Co., 117 North Jefferson Street, Chicago, sales agent. Circular. Relates to a 14-in. vertical drilling machine for handling small and medium sized work. The construction of the machine which was illustrated in THE IRON AGE, Aug. 2, 1917, is gone into at some length. An illustration and condensed table of specifications are included.

Gage Standards.—Ibsen & Co., 404 Keefe Avenue, Milwaukee. Pamphlet. Relates to a line of gage standards for determining dimensions of interchangeable parts easily and quickly. The standards consist of a series of hardened and tempered rectangular steel blocks, which can be supplied in a number of different combinations, giving increments of 0.001 in. In addition to the standard sets, all of which are illustrated, a number of special sets can be provided.